THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXVIII. No. 1740.] LONDON, SEPTEMBER 15, 1896. [48TH YEAR. PRICE 6d.

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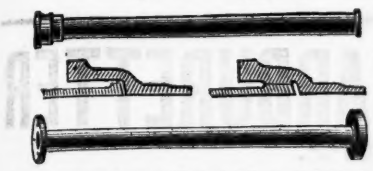

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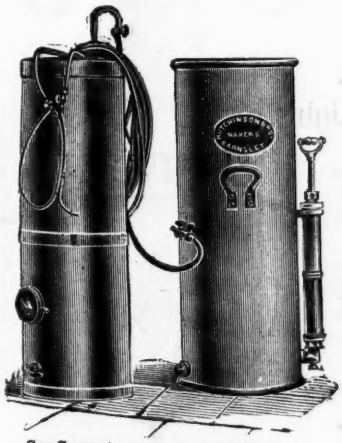

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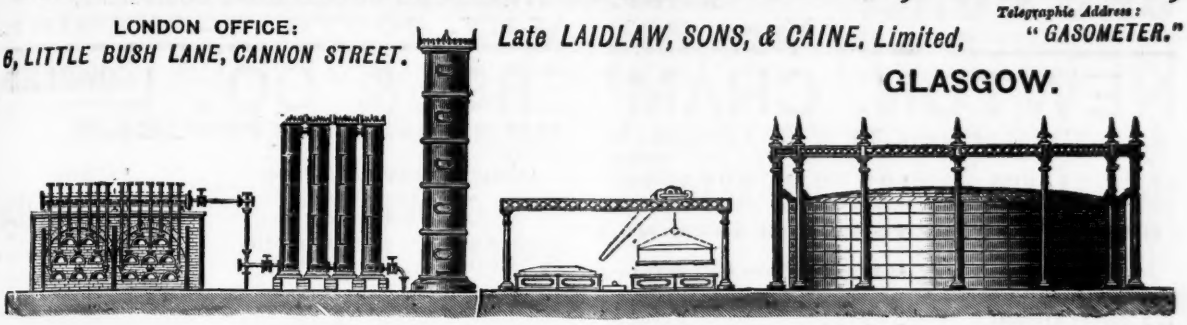

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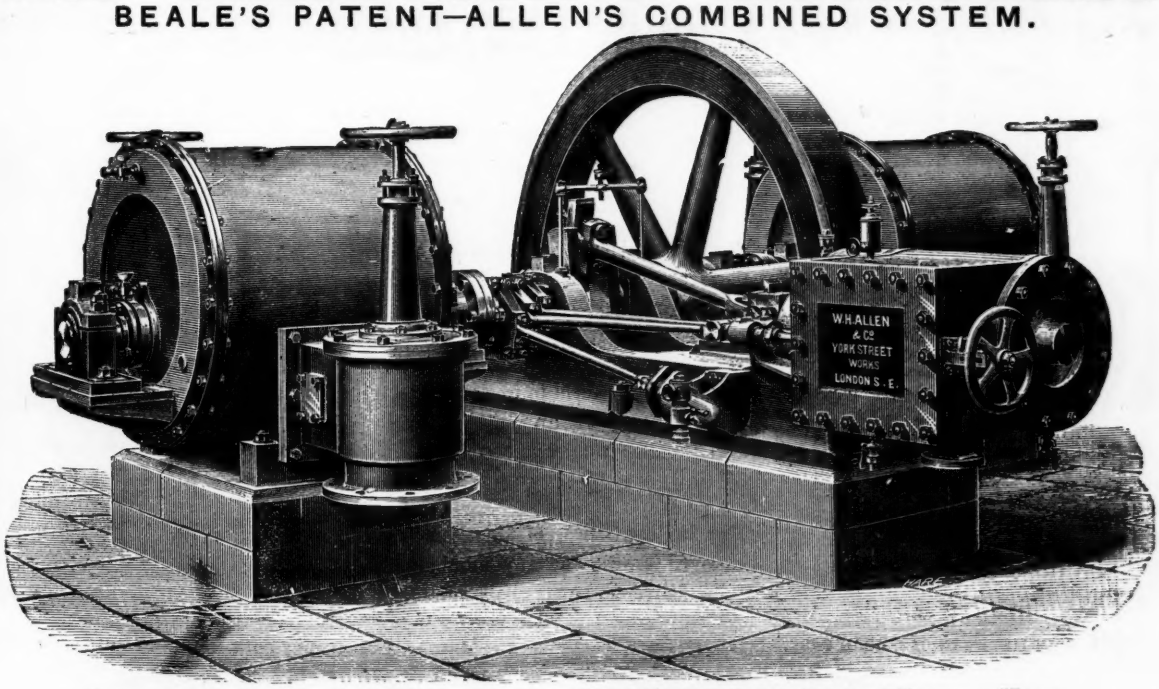

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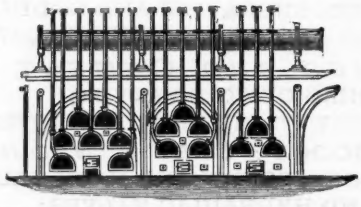

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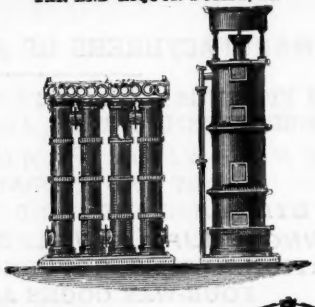

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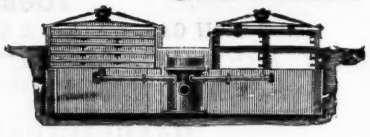

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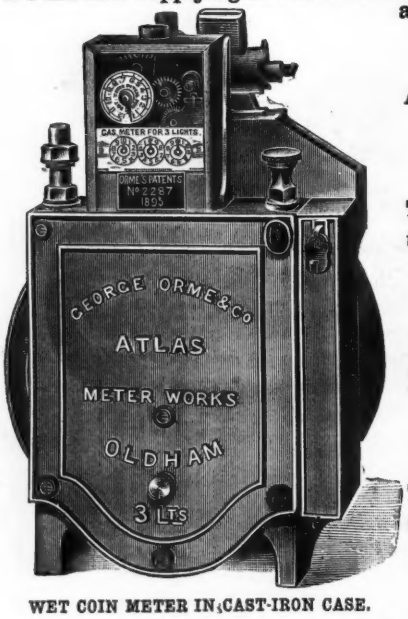

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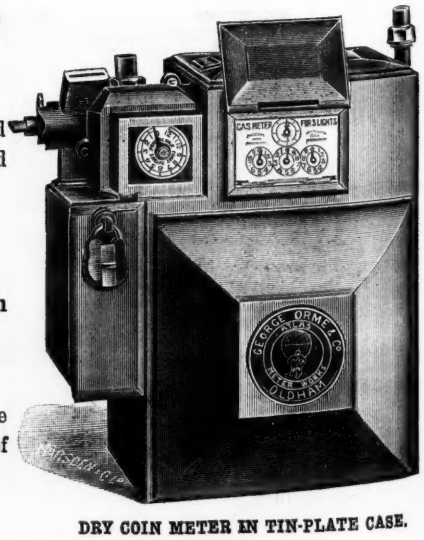

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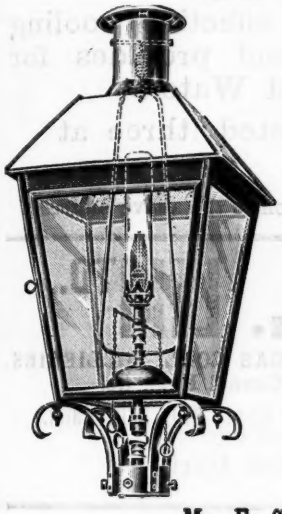

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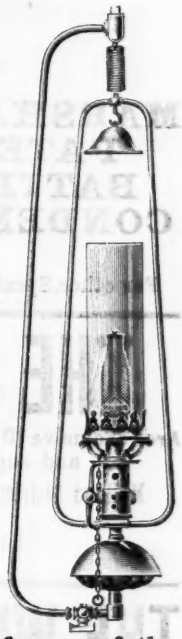

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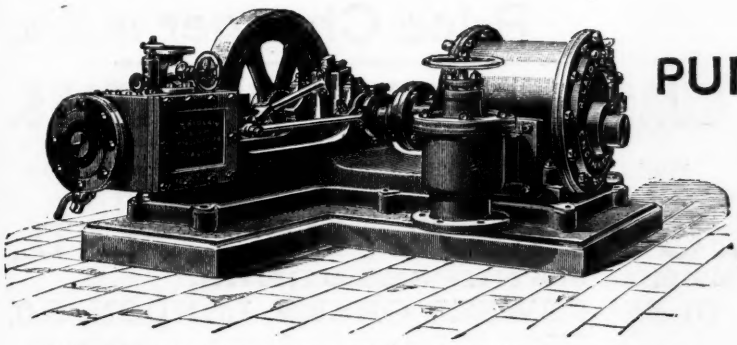

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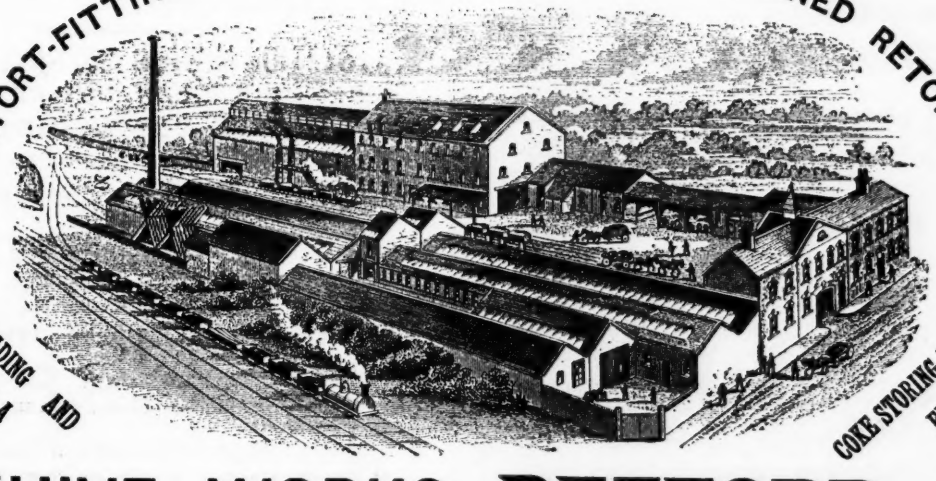

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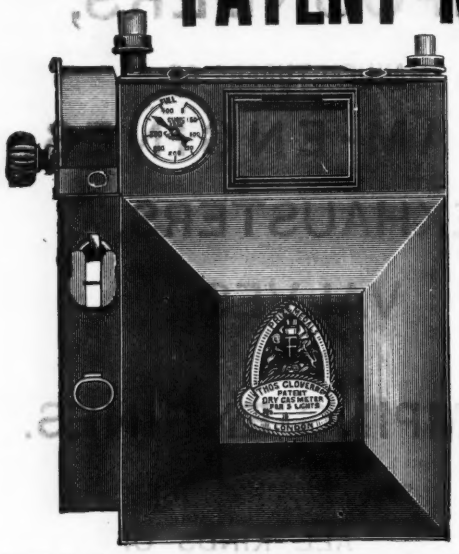

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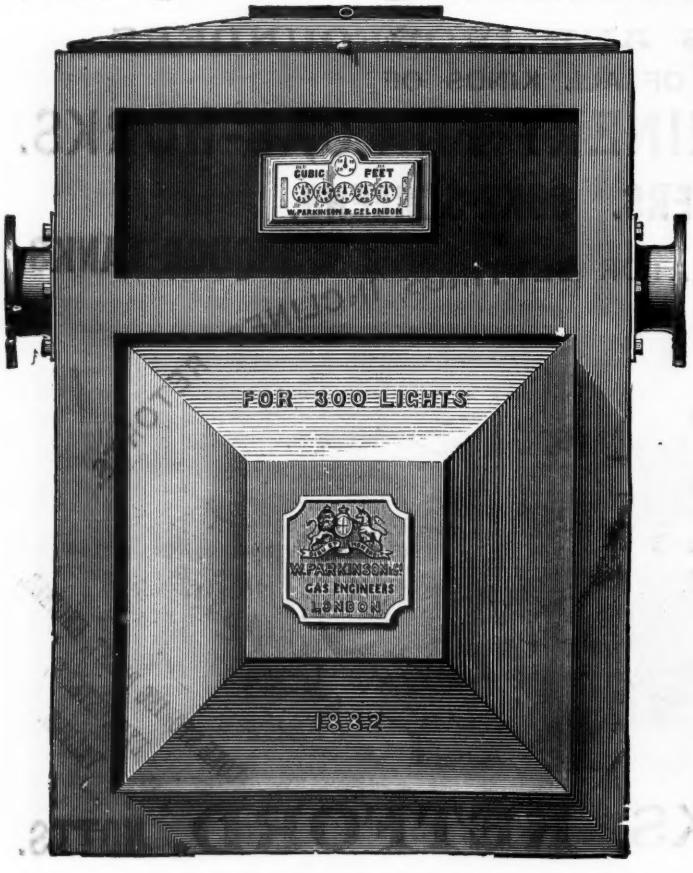

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EDITORIAL NOTES.

Mr. E. Fry on Illicit Commissions.

SOME thoughtful observations on the subject of secret commissions in trade were communicated to "The Times" on Saturday last by Mr. Edward Fry, of Bristol, whose name recalls memories of those remarkable people who have not found the most rigid honesty of word and deed incompatible with money-making. Mr. Fry has taken some little time to digest the remarks of the Lord Chief Justice on this subject; and his letter takes the form of a deliberate indictment of many specified modern business methods, among which the giving and taking of illicit commissions forms only a single item. "Bribery," says Mr. Fry, "in one form or the other riddles and makes "hollow and unsound a great deal of business, including "transactions in which the professions of engineers and "architects are interested. Sometimes the bribery is "effected by the payment of a single sum, more often "under the name of a commission, or by way of percentage; "sometimes pickings are secured under the form of a "royalty on a worthless patent, or stipulations as to the "firms from which articles are to be obtained for use in "the work to be done." Mr. Fry declares he is not concerned to inquire to what extent our country is worse than other countries, to what extent this age is worse than those that have gone before, or to what extent such practices stand in the way of the prosperity of our trade. It is enough for him that they do exist; and he asks if it is not "possible that the great professions "of engineers and architects may bestir themselves "and consider whether something cannot be done to check "practices which the honourable members of their calling "admit and deplore? Is it too much to hope that the "great body of honest and straightforward manufacturers "and traders who find themselves hampered and vexed by "the dishonest practices of those around them, can pluck up "heart of grace to expose and put down what harasses "them from day to day?" These questions have been often asked before; and it is pretty safe to say they will be heard of again, because the evil referred to is really due to human frailty, and to a number of other causes which we are likely to have always with us. There are some things which only a very small minority of men will do, even to gain great and immediate advantage; but there is a wide margin in affairs where the necessity for getting as much money as possible is permitted to outweigh theoretical considerations of perfect equity.

We do not believe the illicit commissions system is a growing evil. On the contrary, there is reason for thinking it has disappeared from many departments of business where it was once rampant. Eternal vigilance, however, is the price of freedom from this pest. The great engineer or architect who would not countenance anything of the kind, if he knew it, is liable to be fooled to his face by his subordinates, unless he keeps a very sharp eye open to this possibility. It is impossible to doubt, unhappily, that in the class of business with which engineers and architects are not directly concerned—in the forcing of specialities upon the markets, for instance—there is a vast amount of bribery of intermediaries; and it is difficult to see how this is to be got over. There is so little morality, strictly speaking, in so much of the business that is done in the world, that it seems almost pedantic to invoke the name in connection with those little confidential transactions between the would-be seller and the agent of the buyer which smooth the way of trade in fresh channels. Somebody, for instance, has a new paint to sell. He may give his commodity a "fetching" name, and claim with justice that it is a very good paint as paints go, and better than most; but he has got to persuade users of paint that it is to their advantage to buy his paint rather than somebody else's. Unless he can do this, he will fail in business, his creditors will go unpaid, and everybody dependent upon him will suffer. How is this paint manufacturer to get a footing in a world already painted, so to speak, up to the eyes, unless he makes himself agreeable to his possible customers? And where is he to draw the line separating legitimate enterprise from illicit temptation? The line can be drawn,

of course, and is drawn by the most confirmed briber; but he draws it in a different place from the boundary that would be indicated by Mr. Fry. After all, individual sense of rectitude must be the guide of conduct in such matters; and in the wider cultivation of this sense lies the only guarantee that business enterprise will purify itself from its corruptions. The public at large have a responsibility in this regard also, which consists in seeing that those professional and official personages to whom must perforce be confided the duty of spending public funds, are kept by fair remuneration beyond the reach of the sorest temptation—that of "feathering their own nests" by improper means.

An Interesting Point at Tottenham.

THE appearance of Mr. Corbet Woodall in the chair at the recent half-yearly general meeting of the Tottenham and Edmonton Gas Company was in itself an incident of sufficient interest to warrant our taking some special notice of the meeting; because Mr. Woodall is usually seen in the different capacity of critic or adviser of gas company administrators. We forget for the moment if this was absolutely Mr. Woodall's first public appearance as the official apologist for the administration of a gas undertaking for the conduct of which he is, as a member of the Board, partly responsible; but at any rate he filled the part very acceptably, delivering an address to the proprietors which was certainly of exceptional interest. This is the more remarkable as it is hard to make a thrilling tale out of the experiences of a suburban gas company which has been able to register a 12 per cent. increase. The most noteworthy of Mr. Woodall's utterances on this occasion referred to the prospect of the Company undertaking the supply of electric lighting in their district. He explained that the Directors had "absolutely no feeling" in regard to the electric light, except that of being satisfied that if it should be required in their district, they are in a position to supply it cheaper than anybody else. This being so, if the Local Authorities concerned are agreeable, the Directors will not hesitate to ask the proprietors to approve of their obtaining the necessary powers for adding such a branch to their business. Upon the question of the likelihood of the Local Authorities concerned coming to any such agreement with the Company, we cannot offer an opinion. Upon that of the expediency of the Company, in the event of such an agreement being arrived at, branching out in this new direction we have an opinion which we shall not hesitate to express because it may appear, on the face of it, like a reversal of what has been advocated in these columns before. In this event we think, then, that the Company might justifiably make the new departure. This is not really a reversal of our old opinion as to the wisdom of gas companies, especially in England, leaving electric lighting alone. This judgment still holds good, when the case is that of treating electric lighting as a rival industry to gas lighting. At the period when we formed and formulated this opinion, with all the emphasis at command, it was wholly and solely as a rival industry to gas that electric lighting was everywhere regarded; and we then declared that it would be better for gas companies to stick to their own line of business. Events have vindicated this counsel. The gas industry is bigger and more prosperous than ever; while electric lighting, so far from being its rival, is already in the hands of many municipalities a side-show to the gas undertaking, with a fair prospect of being useful and profitable in its own degree. There can be but few cases where a gas company could act acceptably as a municipality would do in the same situation; and the Tottenham and Edmonton case may be one of these. We cannot say positively that it is; but it is equally impossible to say that it is not. If it is, then the analogy of municipal policy may be followed out in practice, without detriment to the gas undertaking, and possibly to the advantage of the community. There is the whole thing; and it will be extremely interesting to follow up the local development. The Gas Company will not be spared the necessity of adding a single new retort house to their gas generating plant during the next ten years, whether they have an electric lighting station or not. There is no single municipality in the district that could undertake the supply of electricity for lighting purposes with any reasonable hope of making a profit by it. It is doubtful if a company could pay for a separate administration and staff out of the same business; yet there may be a certain though a small demand for electric lighting, which, Mr. Woodall says, the Gas Company could supply more cheaply than anybody else. If all the parties concerned are agreeable to this course being taken, we see no objection to it in the quite different general argument that the proper business of a gas company is to sell gas.

The Trouble in the Engineering Trade—A Lame Conclusion.

THE strike of engineers at the Govan shipbuilding yard of Messrs. Dunsmuir and Jackson was officially terminated last week by the Glasgow District Committee, upon terms which cannot be regarded as satisfactory, or as containing the promise of restoration of permanently good relations between employers and employed. The strike arose because the firm declined to dismiss one man who was not a member of the Amalgamated Society of Engineers, and with whom—apparently for no other reason—the Society men refused to work. In thus standing out for the freedom of labour, the firm were supported by the associated shipbuilders of the Clyde, Belfast, and the North of England, and all these firms issued notices which would have cleared the whole of the Society men out of their shops. Moreover, the Central Executive of the Amalgamated Engineers condemned the action of the Glasgow strikers, which was a breach of the agreement made at the termination of the last trouble of the kind on the Clyde and in Belfast. Up to the end of the week before last, there was every appearance to show that a great industrial struggle over the principle of freedom of labour was imminent. Suddenly, however—it might be said precipitately—the local outbreak was composed, and the threatened general action was declared to be "off" for the present. The man whose claim to exercise that liberty of action within the law which is supposed, outside trade unions, to be the birthright of every Briton was to be got rid of at the end of the week, whereupon the magnanimous strikers were to return to work. It is not for us to blame the action of the particular firm in thus apparently yielding the point of principle which they and their associates had declared themselves willing to defend at all costs. The statement has been made that the man himself was quite disposed to leave his job, rather than continue to play the part of the "odd man," amid surroundings where the general lack of sympathy was apt to take the expression of a casual brick-bat. Perhaps the man found himself unfitted for the halo of martyrdom for which everybody who defies the public sentiment of his class and his companions must be prepared to exchange present comfort and even personal security. At any rate, the man leaves his employment, and with him disappears for the moment the *casus belli*. Such a settlement is no settlement at all. The employers may be absolved from blame for temporarily relinquishing a cause which has ceased to assert itself; but the cause is there, all the same, and may spring again into prominence at any moment. The local triumph of the Glasgow District Committee, in defiance of the Central Executive of the Society, bodes ill for the future. Altogether the case is left in a very unsatisfactory condition for all parties. A great strike and lock-out just now would doubtless have been a calamity, and the circumstance of its having been averted is so much to the good. Unhappily, there is reason to believe that the manner of this postponement of the decisive battle of trade unionism against freedom of labour will only tend to render it more desperate when it comes.

Is Modern Artificial Lighting Prejudicial to Health?

WHAT is really the best standard of artificial illumination for the constant use of mankind in the present stage of civilization? The question was raised by Earl Percy, as President of the Annual Congress of the Sanitary Institute just held at Newcastle-upon-Tyne. It arose in connection with a query as to the influence of electric lighting on the eyesight and the general health of communities; and the answer is usually that, with judicious handling, there is no reason why this form of illumination should tax eyesight or health more heavily than the methods of lighting hitherto in use. It is nevertheless certain, as Earl Percy remarked, that whether the service is afforded by electricity or other agency, we are in the habit of revelling in a flood of artificial light far exceeding in brilliancy that with which our forefathers were contented; and there are not wanting those who declare that both their vision and their general condition have already suffered in consequence. Earl Percy asked if this is imagination, or if the complaint has a foundation

of fact; and the question is not one to be answered off-hand. It seems rational to say that, when people have night work to do, they ought to have good light to do it by. But this again raises the general question as to the necessity or advantage of night work. There are those who allege that the modern practice of turning night into day is responsible for a great deal of the asserted increase of lunacy in our midst; but then again both the allegation and the assumption which it takes for truth are equally strenuously denied by other observers of the course of civilization. It seems obvious that the prolongation of the daily period of intellectual activity by the aid of brilliant artificial lighting, must bring an increased strain upon the mental powers of the race; but there is so far little trustworthy evidence as to the general effect of this alteration of the living conditions of humanity. It is certain, however, that the past few years have witnessed the introduction, and the partial withdrawal, of high-power lighting centres, from which it may be gathered that the general sentiment is in favour of moderation in the scheme of artificial lighting for general purposes.

The Trade Union Congress—The Question of Reporting.

The Trade Union Congress has been in session in Edinburgh during the past week under the presidency of Mr. Mallinson, who has received from the Lord Provost of the City the character of a "model working man." An air of great calm, not to say dulness, pervaded the meetings, which was perhaps due to the desire of the delegates not to copy the dreadful example of the recent International Trade Union Congress. So they moved their familiar resolutions and passed them without more excitement than the intrinsic importance of these exercises deserved. Much of the decorum of the meetings must also be due to the operation of the policy adopted at Cardiff last year, for the exclusion of the professional socialist lecturers who helped to enliven the proceedings of former congresses. Yet the present Congress managed to make itself sufficiently ridiculous without the help of these ladies and gentlemen, by passing a resolution excluding from the meetings the reporters of non-society newspapers. Since all the Edinburgh newspapers are of this description, the effect of the resolution if acted upon could only be to deprive the meetings of that publicity which is the life of all gatherings of the kind. It is a delightful illustration of the ways of trade unionists that the leading Edinburgh daily newspaper was approached some days before the opening of the Congress by several delegates who informed the management that the resolution in question would be proposed and carried, and offering in this event to supply reports of the proceedings. The answer given to these proposals was simple enough, and was such as might have been expected. "If the Congress chose to exclude our "reporters, then no report of the proceedings would be "given. We should not be content to rely upon reports "furnished by unskilled hands, which might do injustice "to many men in the Congress." It is pretty safe to say that some members of the Congress would be only too glad to have the power of selecting the portions of the proceedings that would appear in print. The incident is not a very important one in itself; but it will serve to indicate what is a very general mistake on the part of those who have the engineering of other public functions besides meetings of trade unionists. It is the fond delusion of some of these worthy people that the public press, or such portion of it as may for any reason take cognisance of the proceedings in regard to which they happen to exercise a little brief authority, is greatly indebted to them for their good offices in allowing reporters to be present on these occasions. The fact is, of course, that the obligation, if any, is all on the other side. What would the trade union movement have amounted to, for instance, without the notoriety lent to it by the public press? Indeed, what are congresses and such gatherings for, if not to advertise the movement in connection with them in the only way possible in the circumstances—through the newspaper press? The advertisement is the whole thing.

The New President of the Iron and Steel Institute.—Mr. Edward P. Martin, of Dowlais, has been chosen by the Council of the Iron and Steel Institute for the office of President for the term of two years. He is the managing head of the chief metallurgical establishment in South Wales; and his election is very popular among the members.

WATER AND SANITARY AFFAIRS.

Sir John Lubbock declares himself fully convinced that "the purchase of the London Water Companies under "existing circumstances would be a gigantic financial "blunder." Twice in his letter which appeared in "The Times" last week, Sir John uses the phrase "under "existing circumstances." Does this imply that under some other circumstances it might be advantageous to effect the purchase? What has the distinguished baronet in view? Perhaps some explanation may be derived from that part of his letter in which he says: "As the "law at present stands, all our loans must be redeemed "in sixty years. Possibly, therefore, if the obligation to redeem were abrogated, Sir John would become favourable to purchase, so far as cost was concerned. At least, his objection would not be so strong then as it is now. Doubtless the redemption of the water stock would be a weighty matter; and we are warned of "the probability— "not to say certainty—that the result would seriously "raise our rates." Even if the period for redemption were extended to one hundred years it is considered that the sum required "would fall very heavily on existing rate-"payers." But we are admonished that "there are also "other considerations." The London County Council are already overburdened with work; and it is not desirable to add unnecessarily "to the ever-increasing army of "County Council employees." If purchase is to be avoided, what remains? Sir John says "control." This, he has reasons to believe, could not, and would not, be "seriously "resisted" by the Companies. Of course, very much depends on the kind of control that is proposed. The "Pall Mall Gazette," in remarking how it has become more than probable that the County Council "will be "relieved by the Government of the task of dealing with "the water question next session," says there can be little doubt the Government will base their scheme "on some "such system of control as was proposed in Lord James's "Water Board Bill." We rather look upon that Bill as a stepping-stone to purchase. That the Bill could be modified so as to stop short at control, is possible; but whether so huge a machine as the Water Board is necessary for anything less than absolute possession, seems fairly open to doubt. In some shape or other control is "in the air," and may be expected to mould the Government plan. A somewhat blundering letter, dated from Whitehall, and written by "A Government Official," has formed part of the correspondence on the Water Question in "The Times," and has hit the mark here and there, though far astray on some points. The writer considers that "the eight Water Companies do their work fairly "well;" and he approves of control in preference to purchase, at the same time expressing his opinion that "the "much-advertised so-called water famine will doubtless "force some action." The "famine" is doubtless "adver-"tised" for this purpose, but quite apart from any benefit to the consumer.

The resumption of the constant supply in the district of the East London Company, which takes place in the course of this week, by no means abates the virulence of the attack levelled against the Company by journals of the Progressive class. On Thursday last, an editorial article in "London" asserted: "There will not be a "constant supply yet; and, although the Company is "under statutory obligations to make the supply constant, "it does not mean to return to this system if it can possibly "help it." We are not quite sure that the East London Company are under "statutory obligations" to give a constant supply; and even if they are, they are free from liability in the event of any unavoidable interruption to the supply, in consequence of frost, drought, or other cause. As for any determination on the part of the Company not to resume the constant supply so long as they could "possibly help it," the very reverse is the fact. They have increased the supply as rapidly as the state of their reservoirs would allow; and the constant service will be universal by the end of this week. Had the County Council possessed the water supply, they could have done no more. They might, indeed, have run the reservoirs dry, and so failed to give any supply at all—a contingency against which the Company felt bound to take precautions. The Company are accused of having "cornered" their supply, and are described as "cutting it down" at their

own will, as if they had abundance at their command, would they but give it. They are now censured in the severest terms as "agitating for the restoration of the cisterns." If people prefer to be without cisterns, they can have their own choice. Only they must make up their minds to suffer more or less inconvenience—however rarely it may occur—when the supply is interrupted by the necessity of effecting some repairs to the mains. An attempt is being made to show that cisterns and the constant supply are diametrically opposed to each other. The truth is that, without the cistern, the constant supply is not safe. The cistern is a precautionary form of storage, and is practically an extension of the reservoirs. The County Council argued that the Company had no need of further reservoirs, because there was abundance of water. Now the argument is held that, where there is constant supply, there is no need for cisterns. The latter need is only occasional; but it is none the less real, and is emphasized by the sufferings of East London owing to the absence of cisterns during the extraordinary drought which has only lately come to an end.

There is to be a meeting of the London Reform Union this evening—not for the purpose of upsetting the present Government, but "to condemn the neglect of the East "London Water Company, and to urge the establish- "ment of a municipal water supply for London." There seems to be an idea among a certain class of enthusiasts, that a municipal water supply is quite independent of frosts and drought. If there is any want of water, it is due to the "neglect" of a water company. A fine array of names is paraded in connection with to-night's meeting; yet who will be there, and who will be reckoned upon us sympathetic though absent, is not very clear. We can only hope—though in a faint degree—that whoever may speak on the occasion will bear in mind that it was not any "neglect" on the part of the East London Company which threw back, by the space of a year, those storage works which the County Council declared to be altogether unnecessary, but which recent events have proved were absolutely required. Had the County Council prevailed in 1894 as in 1893, the consequences would have been far worse than anything yet known. For such escape, the people of East London are indebted to just one vote, which turned the scale in favour of the Company's Bill on the second occasion. The triumph of "municipalization" in 1894 would have resulted in a catastrophe which might even have nonplussed the "Daily Chronicle." Thanks are due to the Company, who understand their responsibilities, and who successfully resisted those tactics which would have issued in a great public disaster. The Company have not neglected their duty; and the people who are to meet in the Great Assembly Hall in the Mile End Road to-night should be told as much. But the whole affair is taking a political aspect, though we are ready to believe that many zealous reformers understand the question better than to abuse the Companies who have charge of the water supply. There must be an object to serve in the perpetual crusade going on against the East London Company. The language used extends beyond local limits, and is aimed at the Metropolitan Water Companies in general. The "Water Lords" are to be extinguished; and one great "Authority" is to ensure a contant supply all the year round. Perhaps it would not be amiss to suggest the Meteorological Department as the ruling power. The conception is not more absurd than to hold a Water Company responsible for the emptiness of their reservoirs in the absence of rain.

Goldsmiths' Institute Lectures.—We have received from the Secretary of the Goldsmiths' Institute an abridged prospectus of the session 1896-7. We notice that in the engineering and chemistry sections, there will again be a course of lectures on "Gas Manufacture" by Mr. A. G. Bloxam, F.I.C., and Mr. W. J. Lineham, M.Inst.M.E.—the first-named gentleman dealing with the chemistry of the subject, and Mr. Lineham with the plant and processes employed on gas-works. Mr. Bloxam will also conduct a second-year course, with laboratory work, in the chemistry of gas manufacture. The lectures (which commence on Oct. 2) will be illustrated by diagrams and experiments. All engaged in connection with London and suburban gas-works who desire to have something more than a superficial knowledge of the manufacture of gas cannot do better than avail themselves of the lectures.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 514.)

THE memorable incident of the past week has, of course, been the raising of the Bank of England rate of discount from 2 per cent. (which had been fixed on Feb. 22, 1894) to 2½ per cent. It was a veritable bolt from the blue; for, although the tendency had plainly been setting that way for some little time, no one was prepared for it to come on Thursday. As usual, when people are taken unawares, they are apt to get a little flustered; and perhaps more was made of the rise than need have been. The ultimate effect should be decidedly good, if only as a salutary warning to those who have presumed too much on getting cheap money to play with. Business in general was very quiet—the Jewish holidays helping to reduce it; but everything was fairly firm until Thursday. After that, everything went to pieces; and the "bears" as usual aggravated matters by getting up some alarming rumours about the Eastern question. Prices have suffered all round, and none more than Consols, which opened on Monday at 112½, and closed on Saturday at 110. During all this anxious time, the Gas Market remained pretty quiet; business being decidedly more limited than in the preceding week. In Gaslights, there was a slight reaction in the "A" stock, which began to show itself before the rise in the Bank rate, although the quotation did not recede until Friday. The closing mark was 316, which was a shade better than the worst of the week. A fair amount was done in secured issues at about good middle prices. South Metropolitan was pretty active, and was strong with business done two or three times at as high as 155. Commercials remained quite stagnant, except for a small parcel of debenture stock, which went at middle figures. Among the Suburban and Provincial Companies, British was the only one to show any activity; and it commanded a good price. In the Continental group, Imperial was rather active at the old figures, not showing any disposition to move; Union was strong at an advance; and European very firm, but unchanged. None of the rest made any sign, except Belgrano, which had a rise. There was more business done in the Water Companies than in the preceding week; but quotations underwent no variation.

The daily operations were: Gas stocks in general opened well on Monday; and the prices realized were good all round. Continental Union advanced 2. Tuesday's transactions were nearly all in Gaslight issues; all commanding good middle prices. The only change was a rise of ¼ in Belgrano. Business on Wednesday was inconsiderable; but prices held on well, though quotations did not vary. Thursday was a quieter day, and did not show any particular feature; quotations again remaining stationary. On Friday, Gaslight "A" was flatter, and receded 2; but some of the rest commanded very good figures, especially South Metropolitan and British. Saturday's transactions were very limited; and quotations closed without variation.

ELECTRIC LIGHTING MEMORANDA.

Continental Electricity-Supply Stations—Popularity of Arc Lamps on the Continent—Low Cost and High Prices—The Waste of Coal in Electricity-Supply Stations.

IN the issue of the "Electrician" for the 4th inst., there is given a synoptic table of Continental electric supply station statistics, stated to be compiled by the Association of Representatives of German Electric Supply Undertakings. The original data were published in a German technical periodical; and the present table is based upon these—the chief figures having been condensed, converted, and generally "Englished" by our contemporary, with a devoted care and an amount of labour that can be appreciated only by those who have had similar work to do. As it is, the table is a useful supplement to those issued from the same source with the object of marking the progress of the electric lighting industry in this country. Having all the centre of Europe to draw upon for examples, the German list makes a respectable show, both as regards the importance of the stations enumerated, and their number. The first thing that strikes one when looking over the list, is the newness of most of the stations included in it. Seeing how greatly our own Electric Lighting Act has been blamed for checking the early expansion of the electric lighting industry within these realms, it is curious to note that only five undertakings in the German list date from the "eighties;" the oldest of them all being that of the Municipality of Elberfeld, which appears to have been started so long ago as 1887. All the remainder come well within the current decade; and some are very young indeed. Another point is that, although Continental Municipalities are greatly given to "concessions," as a means of getting themselves supplied with many of the services necessary to modern town life, a bare majority of those in the present list have ventured upon their own electric lighting undertakings. Whether this is by reason of their having an overflowing faith in electric lighting as a business, or because they could not place concessions upon their own terms, there is no evidence to show.

It further appears that the alternating system of supply is not much in favour with the German electrical engineers; only eleven stations out of thirty-six being so catalogued, and in some of these places the supply is compounded of both systems. Again one wonders why this should be the case, after we have been so strenuously assured of the superior economy of the alternating system in most circumstances. Our electrical contemporary is struck with the great use which is made of accumulators by these Continental stations, and their large arc-lamp connection. Vienna, for instance, has 7775 arc lamps connected; but then it also has 103,768 incandescent lamps in circuit, and is altogether the largest and showiest city in the group. Hamburg, with more than half the number of incandescent lamps, has only 1105 arc lamps to boast of; while the comparatively insignificant town of Elberfeld, with only 7688 incandescent lamps, needs 2540 arcs. These are the most exaggerated examples of the supposed popularity of arc lamps in these Continental towns; and they are not altogether inexplicable, having regard to the age of the installations and the character of the cities in question. Vienna has already been characterized. Hamburg is also a place where there is a vast amount of "outdoors" to be lighted after the Parisian style; and as to Elberfield—well, at the time when the electric light station was started here, the arc lamp was decidedly more fashionable than it is now; and probably the fashion then inaugurated has stood still ever since.

Our electrical contemporary is also impressed with the low cost at which the unit of electricity can be "made in Germany," according to the table. Hamburg, for example—thanks, as is explained, to its "huge output and to the fact that it supplies current to the electric tramway system of that port—is able to turn out the kilowatt-hour for the abnormally low figure of 1·12d." After this, it must be a source of comfort to the British electrician that the kilowatt-hour is one of those products that cannot be exported from the place of its manufacture. Certainly, this table of total costs of German-made electricity is full of abnormally low figures. On the other hand, it is consolatory to learn, from the list of charges to consumers, that the cheapness of production has not been allowed to vulgarize the article. Thus Hamburg itself asks 9·6d. for the kilowatt-hour, which appears to cost only 1·12d. to make. Vienna charges but little more; the price of the kilowatt-hour of electricity in the Kaiserstadt being only 10·8d., while the total cost of it appears to be 2·41d. Altona is the brightest example of this kind of liberality—charging 8·2d. for what costs little more than a tithe of this amount to make. True, it is explained that most of the charges to consumers are subject to large discounts; but it may also be suggested that similarly most of the entries of total cost must be liable to sundry additions not indicated. This is, in our estimation, one of the most interesting features of the table, though no notice is taken of it by our contemporary.

Another curious disclosure of this interesting table is the large discrepancy between the duty rendered by different central stations for fuel consumed. The worst case appears to be that of Neuhaldensleben—a small place, doubtless, and possibly not a very prosperous undertaking. But, really, 35·2 lbs. of coal consumed to produce every kilowatt-hour sold is, on any account, poor for a scientific use of the fuel. In Copenhagen, the electricians are fain to burn coke and coke dust; yet they manage to do their work for only 8·3 lbs. of fuel per kilowatt-hour sold. In Dessau, the central station is driven by gas power; and the consumption of fuel is at the rate of 50·2 cubic feet of gas per kilowatt-hour sold, which appears to be far and away the best showing in the list. At all events, these data furnish yet further evidence, if it were needed, that when it comes to actual central station working, under commercial conditions, to burn it for electric lighting is about as wasteful a use for coal as can be found. It also appears that the old-fashioned Cornish and Lancashire boilers are able to hold their own with anything in the way of steam generators that Continental engineering can produce; Hamburg, for example, coming once more to the front with a fuel consumption of 4·4 lbs. of pit coal and coke per kilowatt-hour sold. This partly accounts for the economical results of the working of the station; for, thanks to the condition of the English coke trade, this fuel is probably cheaper in Hamburg at the present time than it is anywhere else in the world. It is extremely kind of English gas companies thus to help the Continental electric lighting interest; and if the Continental consumer of electricity does not benefit much by the arrangement, neither does the English gas consumer—so the one victim cannot be jealous of the other.

THE PROBLEM OF MONOPOLY IN PRODUCTION.

In the August number of the "Engineering Magazine," there is a thoughtful article by Mr. Frank M. Loomis, entitled "The Fallacy of Municipal Ownerships of Franchises," which relates to the movement that has been adopted, rather than originated, by modern Socialists for suppressing the individual enterprises of tramway, gas, water, and similiar companies in favour of communistic undertakings. The writer admits that there is no more vexed problem, and none more difficult of solution, than that involved in all attempts to regulate equitably the exercise of what he calls "corporate franchises," or as we should say, undertakings enjoying statutory facilities, but administered in the first place with a view to private profit. He considers, however, and essays to demonstrate, that the real difficulty lies not so much in the complexity of the problem as in "the unacknowledged unwillingness of representatives of corporate interests on the one hand, and of doctrinaire reformers on the other, to do equal and exact justice to all." This, no doubt, is the *crux* of the matter, as we in England are well aware. There is no known guarantee against inefficiency on the part of incorporated undertakings; and, on the other hand, there are no means of curbing the animosity of those politicians who refuse to see anything good in institutions of the kind. It appears, however, that in the United States the chief popular grievance is against "corporations" of a kind that have not as yet been developed into anything like a similar luxuriance in any other country. We allude to monopolies and trusts like the Standard Oil Company, which flourish as plants upon a hot-bed, by virtue of the existence in the Transatlantic industrial and commercial system of something specially favourable to such monstrous growths. What this favourable condition is, has never yet been satisfactorily ascertained; and we commend this task to the earnest attention of the able writers in the "Engineering Magazine." So far as the example we have cited may be taken as typical of the kind of "corporation" dealt with by Mr. Loomis, the most disquieting thing about it is that it has proved capable of extending its non-legal powers to this and other countries; and one would like to know whether it is likely to prove singular in this respect.

Mr. Loomis recognizes a movement of revolt against the operation of such monopolies in the appearance among the American people of many parties, "State Socialists, Populists, Single Taxers, Free Silverites, all under different banners, and ostensibly with different aims," yet united in devotion to the creed of Robin Hood—of the justice of reprisals against the rich and the bestowal of their plunder upon the poor. It would be one thing if the spoils of the unjustly rich could be distributed among those from whom they were originally taken. Unfortunately, this is impracticable; and it is the inherent vice of communistic schemes for resuming possession of the "unearned increment," that they propose to redress one robbery by committing another. "It is a fundamental principle in the jurisprudence of all civilized countries, that the wrongful possessor of property has good title thereto against all but the rightful owner;" whence it follows that the people in their collective capacity, equally with an individual, ought to make good their title to any property in dispute, before taking it from anyone in whose possession it may be found.

Unhappily, the argument which finds most favour with the "Popular" or "Progressive" parties in all communities is not that of meting out equal justice to all concerned in the subject-matter of a monopoly, but rather that of expropriating the profits of the monopolists for the benefit of other people, who would have no better title to them than the original proprietors. "Reasoning from the certain premise that the larger corporations are practically monopolies, and that their charges, uninfluenced and unregulated by competition, are grossly exorbitant, the inference is drawn, not that the charges ought to be regulated and limited, but that the people ought to own and share in the profits realized from the use of the corporate franchises." This is a *non sequitur* so obvious that, Mr. Loomis remarks, many of those who advocate municipal ownership are driven to draw a line between those monopolies which they call "natural" and those which are by contradistinction artificial. Thus they would municipalize a gas undertaking, because it is a natural monopoly; while they would not see their way to dealing similarly with the organization, however clearly monopolized, which controls the supply of raw material to the same undertaking. This difference of circumstance, in Mr. Loomis's opinion, furnishes at most only additional reason for regulating the doings of the municipal or natural monopoly, and not for appropriating it in the name of an outraged public. If, again, the cry for "cheapness" were held to be sufficient to justify the act of municipalization of an undertaking, it is difficult to see where the plea is to stop. "In this connection," Mr. Loomis observes, "it becomes important to understand, first of all, that it has never been shown, and in the very nature of things never can be shown, that the public can manufacture a better article or render better service at a less cost than a private corporation or an individual capitalist." Of course, if the element of profit is eliminated, the public product can and will be sold at less charge to consumers than if the private manufacturer is left free to charge his own price. But this is elementary. "It may as freely be granted, and might as well be argued, that if the Socialistic programme be carried out in its entirety, the first cost of everything to the consumer will be less than under the present industrial system. If the grocer, the butcher, the baker, the tailor, the milliner—everybody, in short—sell his or her wares at cost price, if, in a word, the element of profit is eliminated, of course the charge to the consumer is less. But if, as very frequently happens, the consumer be also a producer, and is barred from any profit, it is difficult to see how he is to gain by any change of system." Is it not on record that those great reformers, the gondoliers who became temporarily Kings of Barataria, proposed to make all products and conveniences free to everybody—except gondolas? "So of the community which hopes to gain an advantage from the consumption or use of cheap water,

gas, fuel, or other commodity manufactured or produced without profit. What is gained in one way, is lost in another." This latter conclusion must be read with understanding, or the scoffers will pounce upon it with gladness.

Mr. Loomis is careful to guard against the inference that might conceivably be drawn from his conclusion—that if what is gained in one way is lost in another, the case of the individual members of communistic municipalities remains the same. It would not happen to any individual member of such a community to have returned to himself, directly or indirectly, the equivalent of the legitimate profits that he might have made in any municipalized business. "The vice of all communistic or semi-communistic schemes is that the least worthy, including the dependent class, are enabled thereby to live on the producer." This is not simply in the abstract, or in a technical sense, but very substantially; because the monopolies from which it is proposed to exclude private capital, and incidentally individual enterprise, comprise a very large and constantly increasing proportionate part of all industry. The appetite for municipalization grows with what it feeds on. Beginning with gas and water, it proceeds to appropriate almost everything that has been sufficiently well organized by private enterprise to have entered upon the status of a natural process. Unhappily, one of the chief attractions of this modern craze for municipalization, or nationalization, is that it offers the benefit of a share in the property in question to those who have no right to it. In Mr. Loomis's view, the modern municipalist is one who would be charitable with the goods of others. "There is nothing altruistic, nothing charitable, in a scheme which purposes taking by force of law from those who have, and giving to those who have not—especially when it involves no sacrifice by the would-be donors."

There is one aspect of this much-debated "monopoly" idea that may be commended to the attention of Socialists and others who are in the habit of regarding the subject from the communistic standpoint. If there are monopolies, statutory and otherwise, of certain services and industries, there are equally monopolies of production. It is, in short, the aim of every trade union to make the practice of the trade to which it applies a strict monopoly in the hands of a limited number of practitioners. Recent communications in the newspapers have made the public acquainted with the condition to which trade unionism has reduced the English glass trade. This is a natural industry which is being paralyzed in order to keep up the wages of a limited number of workers, with the result that the British consumer is being supplied with lamp chimneys, gas globes, table glass, and other articles in glass from abroad. "Glasshouse after glasshouse is being shut up; a limited number of men get very high wages, a large number get none at all, and are receiving unemployed pay from their union. The foreign producer is thriving, while the English firms engaged in this industry are becoming fewer and fewer in number." Here is the other kind of monopoly that Progressivism ought obviously to set about municipalizing, in the interest of cheapness and for the sake of the consumer. The failure of the new industrial wisdom to perceive this effect of trade unionism supplies another illustration in support of the argument about the unwillingness of "representatives of corporate interests on the one hand, and of doctrinaire reformers on the other, to do equal and exact justice to all." So far as many highly organized trades are concerned, the most potent "representatives of corporate interests" known to the industry or to the community, are the trade union managers.

These observations tend to show that when we come to discuss such a subject as "monopoly," whether natural or artificial, whether of the produce or the labour of production, we are confronted with a matter of such complexity, striking so far into the foundations of industries in capital and labour, that the wisest may well shrink from the task of reducing all the complications and ramifications into a "concatenation accordingly." Much less is a comprehensive solution of the problem to be expected from the self-chosen and self-taught prophets of the New Democracy, or the Board School trained intellects that undertake the guidance of the new Progressivism.

PERSONAL.

Mr. E. W. Smith, the Gas Manager of the Cockermouth District Council, has been successful in obtaining the position of Manager of the Chelmsford Gas Company's works. The vacant appointment was advertised in the "Journal" for the 4th ult.; and it is understood that there were 64 candidates.

It is with pleasure that we announce the marriage of Mr. Ernest L. Fletcher, the eldest son of Mr. Thomas Fletcher, of Warrington, and Miss Eleanor Florence Dickinson, daughter of the late Mr. Aspden Dickinson, of Blackburn. The ceremony took place on Thursday last, at St. James's Church, Birkdale; and later in the day, the happy pair left for London *en route* for France and Switzerland, where the honeymoon is to be spent. The presents were numerous and costly, among them being a handsome set of carvers, silver mounted, in oak case, from the Sergeants of the company of volunteers of which Mr. Fletcher is Lieutenant.

OBITUARY.

The death took place recently of Mr. E. L. Watts, of Douglas, Isle of Man. The deceased, who had reached the ripe age of fourscore years, was a Director of the Douglas Gas-light Company.

Just as this week's "Journal" was going to press, we learnt of the death of Mr. William A. Cogar, who for many years was a valued officer of the Gas-Meter Company, Limited. As long ago as the year 1873 he was, we understand, appointed Secretary of the Company. He died at his residence, 119, Highbury Quadrant, on the 8th inst., and was buried last Saturday at Kensal Green Cemetery.

Alderman J. B. Parker, J.P., of Ripon, who was for many years Chairman of the Gas Committee of that city, died last Wednesday. It was through his efforts that the gas-works were entirely re-organized in 1892; he then being Mayor of the city. The funeral took place on Friday, when at the instance of the Marquis of Ripon, who is Mayor this year, the obsequies partook of a public character; all places of business being closed. The deceased was aged 57.

It is with regret that we have to announce the death of Mr. Robert Sheppard, the predecessor of Mr. E. D. Sapey in the management of the Horsham Gas Company's works. He held the appointment for the long period of forty years; resigning it about the year 1884. He was elected a member of the old British Association of Gas Managers in 1872; and continued his connection with it under that title and The Gas Institute until he gave up active work. He was also a member of the Southern District Association of Gas Engineers and Managers until the year 1886.

The death is announced as having taken place on the 8th inst., at "Royal Mount," Milltown, Co. Dublin, of Mr. John Joseph Cotton, third son of Mr. W. F. Cotton, J.P., the Secretary of the Alliance and Dublin Consumers' Gas Company. The deceased gentleman was Assistant to his father; and his loss will be greatly felt by the Company. The funeral, at Glasnevin Cemetery, on Thursday, was attended by a considerable number of the leading citizens of Dublin. The late Mr. Cotton, whose premature death is so deeply regretted by all who knew him, had a very wide circle of friends; and there is general sorrow at the early closing of what promised to be a most successful career.

Mr. R. W. Peregrine Birch died suddenly on the 30th ult., at Foyers, N.B., where he was professionally engaged in connection with the works of the British Aluminium Company. Noticing the death, "Engineering" says: Mr. Birch was held in high repute as a hydraulic and sanitary engineer, and had been engaged in most of the important inquiries, parliamentary and otherwise, relating to water supply and sanitary subjects during the past twenty years. He usually acted for the London Water Companies in their struggles with the County Council, and gave evidence on their behalf on several occasions, notably before Lord Balfour's Commission, when he expressed the opinion, which he held very strongly, that it was unnecessary to look beyond the present sources for the water supply of London. He believed that if adequate works of storage were carried out, and unnecessary waste of water prevented, the needs of London could be amply supplied by the existing Companies; and this view was adopted by the Commissioners in their report. Mr. Birch was for many years a member of the Council of the Sanitary Institute and of the Royal Meteorological Society.

A New Pyrometer.—Wiborgh has devised a new method of pyrometry, specially applicable to very high temperatures. An explosive material, such as that used in percussion caps, is hermetically sealed up, and placed in the centre of a body of refractory material. This body then constitutes the "thermophone" which is thrown into the furnace of which the temperature is to be ascertained. The temperature is a function of the time which elapses before the explosion takes place. A table has been constructed giving the degrees of heat corresponding to different intervals of time, by letting thermophones explode at known temperatures, and observing the time in each case. By reference to this table, the temperature corresponding to an observed interval of time is found.

Another Petroleum Gas Machine.—What is claimed to be a revolutionary system of gas-lighting is, says "Industries," now being introduced to the public. The invention is of German origin; being owned by the proprietors of the Dürr light. The gas is a petroleum gas, manufactured from the oil in a producer. It is asserted that an illuminating gas, quite equal in photometric quality to the best existing standard, can be supplied through mains at a cost of less than 1s. per 1000 cubic feet; also, that an installation, equal to 100 lights, can be laid down for an inclusive expense of about £30. Of course, this sum would relate to the generating plant only; the mains and connections would probably cost much more. The apparatus looks simple—consisting of a small hot-air motor, one or two mixing chambers, an oil tank, &c., and that is all. For use with the incandescent mantle, the gas is said to be excellent, giving with the Welsbach mantle a light of 64 to 65 candles

TECHNICAL RECORD.

WAVERLEY ASSOCIATION OF GAS MANAGERS.

The Seventy-first Half-Yearly Meeting of this Association was held at Galashiels on Thursday. Fully a dozen years have elapsed since the Association last visited this Border town; and the signs of progress which the town has made in the interval were evident on Thursday. Its numerous factories are, indeed, at the present time feeling the adverse effect of competition with Bradford; but it may be hoped that the depression will be temporary, and that the general trade will advance in the ratio it has done during the past few decades. The meeting of the Association was held at noon in Maxwell's Commercial Hotel, and was well attended. Mr. WILLIAM BLAIR, of Haddington, the President of the Association, occupied the chair.

The SECRETARY (Mr. J. Smith, of Selkirk) read the minutes of the April meeting, which was confirmed; and it was agreed to hold the next meetings of the Association on the second Thursdays of April and September next—Haddington and Berwick-on-Tweed being fixed upon as the localities for them.

The PRESIDENT, at the outset, expressed his regret that, owing to long-continued illness in his family, followed by the death of his son, he had been unable to prepare anything like a Presidential Address; but he would be glad to give an opportunity for the discussion of anything they would like to bring forward. However, as they had agreed to visit Haddington in their next meeting, he might say that he should be pleased to see them all there in April; and with reference to that visit, he might be allowed to make a few remarks upon the gas-works there. Up to this year, they had been hampered for room, owing to the ground having been entailed; but it having now become disentailed, they had been able to add fully half an acre to their works. They had formed a coal-store 70 ft. by 40 ft.; and on the north side, where the ground ascended, they had formed excavations to a depth of 9 feet—the effect of this being a shortening of cartage, and a saving of 2d. to 3d. per ton of coals. They had also taken advantage of the space to add to the purifiers. The total cost of the improvements was £1100. He considered this a pretty fair undertaking for a works of their size; and the Directors, in view of the advantages they had gained, had reduced the price of gas by 5d. per 1000 cubic feet—the present rate being 4s. 7d.

Mr. BLACK (North Berwick) said he had a difficulty in getting away coke; the local railway charging 2s. 4d. per ton for the carriage of it from North Berwick to Dunbar.

Several members stated the rates in their localities; and it was the general experience that, where a railway had a monopoly, a higher rate was charged than where opposition had to be faced.

Mr. BELL, of Dalkeith, brought this out forcibly in a comparison of the rates charged for the carriage of Cowdenbeath coal at Peebles and at Dalkeith.

Mr. W. SMITH (Melrose), in reference to an observation by Mr. Bell regarding the demand for coke, said that some years ago there was a very poor inquiry for it; the price being not above 6s. per ton. Now they could easily obtain 10s. per ton for it. Cinders, too, could be disposed of readily; in his case nearly a thousand tons being wanted for school playgrounds.

Mr. M'LAREN (Duns) said that on the previous day he had an offer from a party of 10s. per ton for coke—as much as he could give him. In Tranent, he could not get it away at all.

Mr. BELL pointed out that there was a danger that a party would offer pretty largely for coke one year, and not want it at all the next.

The PRESIDENT remarked that it was desirable to accommodate such customers as bakers—remembering that if there were no gas consumers, there would be no coke to sell. An arrangement, however, could be made for offering the surplus supply to those other parties.

A lengthened discussion on the best mode of fixing the charges for public street-lamps next took place.

Mr. W. SMITH in opening the discussion, said that in his town there were about 68 lamps, each burning 3 cubic feet per hour—an average being taken by two meters; and he considered this number too few.

Mr. M'LAREN stated that when in Tranent he had 60 lamps, and only one meter. He mentioned an instance where, in the case of two meters a short distance apart, the one registered 25 per cent. more than the other. He considered that where street-lamps were paid for on the average, one meter for every 12 lamps was little enough.

Mr. TAYLOR (Jedburgh) said he had four for 130 lamps. He found that low-level meters indicated more consumption than high-level ones.

Mr. W. SMITH endorsed this last remark; the difference on one occasion being, with him, as much as 60 per cent.

Mr. M'LAREN suggested that this discrepancy might have been due to leakage.

Mr. BELL pointed out that the mechanism of the meter exerted friction on the gas which passed through it—friction from which meterless lamps were free; and that this in itself was a disturbing element in the calculation.

The PRESIDENT said the friction in this case would amount to 2-10ths, equal to ⅕ foot per hour.

Mr. W. SMITH said one way to counterbalance this was to see that the meters registered 3 feet per hour.

The PRESIDENT, after narrating his experience of policemen as lamp extinguishers, gave it as his opinion that the only proper check for street-lamps was to take the number of hours the lamps had been burning. He believed that incandescent burners, unless fitted with governors, afforded little or no certainty, as he had found them consuming 4 feet per hour when they only reckoned upon 2½ feet. Dealing with an interpolated remark by a member, that the incandescent burner gave a good light, the President admitted this was so; and he further stated his belief that this light had done a great deal to retard the progress of electric lighting—it being found that as the one increases cost, the other reduces it.

The discussion on technical matters was concluded with a reference to the penny-in-the-slot system, the good features of which received notice from several members.

Mr. BELL stated that many who had never before burned any gas, now became first-class customers.

On the motion of Mr. W. SMITH, the President was awarded a hearty vote of thanks for his conduct in the chair.

After dining together at Maxwell's Hotel, the members availed themselves of a courteous invitation by Mr. Francis Scott, the Manager of the Galashiels Gaslight Company, to visit the works at Galafoot. The weather, which had been showery in the morning, cleared up beautifully; and the drive along the banks of the Tweed, through the classic land of Scott, was greatly enjoyed. Subordinating this aspect of the outing to the practical purpose which had brought the members together, the first feature of interest was the distance—about 1¾ miles—at which the gas-works are situated from the town. The explanation was interesting; the selection of the locality being due to the prescience of Mr. Scott's father, who retired from the active management of the Company about two years ago, after many years of worthy service. Mr. Scott, sen., finding the works within the burgh hampered for want of room, about thirty years ago recommended the selection of a site at Galafoot, opposite Abbotsford, and near the point where the branch railway to Selkirk diverges from the main line to Carlisle and London. Mr. Scott's idea was not at first taken seriously. But it at length won for itself complete approval; and the new works, erected in 1868, have since then amply verified the wisdom of the choice. About 15 acres of ground were secured at the time, affording room enough for all undertakings likely to be taken up by the Company. The loss from leakage—only 3 per cent.—is remarkably small, considering the length of the two 12-inch mains which conduct the gas; the day pressure being 17-10ths. The works themselves are designed in a style which one is more accustomed to see in England than on the Scottish side of the Border. The railway siding from the Selkirk Railway runs right through the works and again joins the railway; thus forming a loop line. The siding is a high-level one—the rails being 25 feet above the floor of the works; and therefore the minimum of labour in bringing coal, &c., is secured. A large iron tank on the high-level siding is capable of containing 40 tons of oil, and gives tangible evidence of acceptance by Galashiels of the well-known Young-Bell process. Indeed, the system was first tried on a considerable scale at Galashiels; and that it is still largely in vogue there, may be regarded as a proof of its enduring merits. Since the introduction of the system, it has been found that the oil escaping in nodules from blast-furnaces can be profitably utilized, in addition to paraffin—a ton of either oil yielding 23,000 cubic feet of gas. While this amount is the same, the illuminating power of the blast oil is only two-thirds that of paraffin; the respective values being 60 and 90 candle power. The oil descends by gravitation to the retort-house, where 12 retorts are fitted up for dealing with it. The coal retorts number 48, and are of large size; the total aggregate of the retorts yielding a distillation of 60 million cubic feet annually. The tar and liquor evolved at the works—amounting to 16,000 to 18,000 tons a year—are pumped up to a tower at the high-level siding, and thence readily despatched by rail. The condensers are of the well-tried "battery" style, and have an imposing appearance; the cleanliness and nice appearance of the works generally being a subject of approving remark. The gas, which is of 30-candle power, is supplied to consumers at 3s. 4d. per 1000 cubic feet; and the Company have always paid the substantial dividend of 10 per cent.

At various stages, technical matters were discussed; and at the close the members expressed to Mr. Scott their warm thanks for the pleasant and instructive visit to the works which he had afforded them.

The Natural Gas Wells in the United States continue to show marked signs of failure; the pressure diminishing so much in some cases that the supply has only been maintained by boring large numbers of new wells. In many instances these wells now have an effective life of a few months only. The best year was 1888, when more than 22½ million dollars were paid to the well companies for the gas. Last year this sum had fallen to 13 million dollars.

PACIFIC COAST GAS ASSOCIATION.

The Fourth Annual Meeting at San Francisco.

(*Continued from p.* 458.)

Mr. J. B. Grimwood contributed a paper on "Oil Tar," dealing mostly with the tar from carburetted water-gas apparatus. The make of gas in the States was 60,000 million cubic feet annually, of which about two-thirds was water gas. This subject was therefore deserving of more consideration than it had hitherto received. Five years ago he had to face the problem of how to dispose of water-gas tar; and he had dealt with it so successfully that the waste product of 1891 was now in good demand. The raw tar was of no use except for fuel, as if employed for painting wood or iron, it did not dry well. Mixed with anthracite or coke screenings it made a good boiler fuel, though the samples he had dealt with retained 15 per cent. of water. If used for other than fuel purposes, it was imperative to take out the water, which could be done by boiling in the open, by distillation, or by a centrifugal machine. The latter would not only reduce the water to less than 1 per cent., but it would also take out all grit and foreign substances. He had adopted open boiling, notwithstanding the danger of fire, and he found that, by proper management, this could be successfully carried on. He used a flat-bottomed vessel 30 inches deep by 45 inches diameter, mounted on an ordinary furnace, with an outlet-pipe from the bottom, and an annular extension, 4 feet high, fixed on the top, with a large overflow-pipe near the top, to prevent danger from boiling over. The furnace-door was so protected with brickwork that the tar could not reach it if any did boil over. The raw tar was pumped into the boiler from the same pump that supplied the pile of screenings for boiler fuel, which was close at hand; and the man who mixed the tar fuel could also attend to the boiler. Steam-coils were safer for boiling tar; but they left it too soft for most of the usual applications. He had made extended observations on the specific gravity of the tar; and found it ranged from 1·104 to 1·190, and averaged 1·151. This was very much the same as coal tar. The dehydrated tar was used for making pavements, and for paint. For the former purpose, it should be heated until converted to pitch that would harden on cooling. If over-heated, it lost its elasticity, and pavement made with it would disintegrate rapidly. Refuse materials, such as clinkers, could be employed; and the pitch should be run straight from the boiler on to them, well mixed, and laid and rolled at once. A roadway laid in this manner three years ago, and subject to continual cart traffic, was now as good as when put down. One barrel of boiled tar would make 50 cubic feet of pavement; so the cost would only be 2d. or 3d. per square foot laid. If required for paint, the tar should not be raised much higher in temperature than was sufficient to drive off the water. It would be fluid when cold, but too thick for use, and would require thinning down with turpentine, in the proportion of 1 gallon to 4 gallons of boiled tar. This made an excellent paint for iron or wood; and a gallon would cover some 64 square yards of metallic surface. It could be used as a priming, or laid over ordinary paint; and as it would not blister or crack, it was an excellent roof paint. He now realized £200 per annum by the sale of boiled tar. In conclusion, he laid stress on the importance of a chemical examination of the Pacific Coast oil tar, which had never yet been made.

Mr. Eichbaum, in opening the discussion, said that oil tar was more valuable than coal tar; but people would not believe this, because it had no smell. It was the only thing he knew of that would remain on purifier covers at the sides; and he had tried paint, tar, tallow, and all sorts of ingredients. Oil tar was equally good for gasholders, as it would actually stop leaks without caulking. The water would separate from it, if allowed sufficient time; so he provided two or three large storage tanks. He considered this plan better than boiling the tar. Mr. Gregory had also proved oil tar to be a good paint for gasholders; but for the sides of the purifier covers, he found there was nothing like petroleum oil. Mr. Powers found that, with the aid of turpentine, the oil tar could be used as a paint for all purposes. Mr. Adams passed the oil tar through long wooden boxes with several compartments, and thus removed a large proportion of the water. After this, it could be safely allowed to mix with coal tar; and the customers would not complain.

Mr. L. F. Fogg, of Vallejo (Cal.), contributed a description of the means by which he had lately telescoped a single-lift 40 feet gasholder without putting it out of action. The second lift was pieced together on a staging above the existing holder; and when complete, the rollers were removed (temporary wooden rollers being used to prevent tilting), and it was lowered into place. The inner cup was attached to the holder from the outside. The whole cost was about £350. The success of the work depended on the fact that the tank had been left large enough, when constructed, to receive the second lift.

A paper on "Gas-Stoves" was forwarded by Mr. D. Decker, of Fresno, who commenced by enlarging on the importance of day consumption, which he considered had not yet received sufficient attention. He went on to argue that it would be a good invesment to fix gas cooking-stoves free. The first cost would be from £4 to £6 per stove; and he found from actual practice that the average consumption of gas was 14,000 to 15,000 cubic feet per annum. Many companies would not hesitate to lay out as large an investment per consumer in the form of mains and services, to get additional business. On 100 stoves the outlay would be £300; and with gas at 10s. 6d. per 1000 cubic feet, the additional income would be over £700. After taking 8 per cent. on £300, which would be only £24, a good margin of profit would remain. All gas companies, of course, were not in a position to give stoves away; and his argument was simply an extreme one, to show that large concessions might be made to the customers in order to secure day consumption.

Discussion being invited, Mr. Crockett said that, after he had endeavoured to sell stoves for two years, and only placed out 37, he adopted the plan of letting on hire. The result was that 1250 were fixed in six months; and he could have doubled this number if he had the stoves and men to fix them. He only supplied on hiring terms to known customers, and subject to a signed agreement. He gave some details of the practice in Paris, where the day consumption is 30 per cent. of the whole. The stoves were systematically inspected; and instructions were given as to the best way of using them. He had separate meters on about 500 stoves; and these showed the average consumption to be 1140 cubic feet per month. In consideration of the expense of stoves, he had not offered a special rate for gas. He had only one price for all purposes; and this was 7s. 3d. per 1000 cubic feet. Mr. Steinman stated that at Sacramento he had nearly 2000 stoves out, which were sold at actual cost or on hire-purchase terms. He was thinking of offering a special rate as a further inducement to day consumption. Mr. Wharton, of Fairhaven, remarked that he was under the disadvantage of having to compete with cheap wood as a fuel, which was sold for about 3s. per large waggon load. He found that, with every endeavour, it was not possible to sell gas-stoves; but he managed to get a few out on hire. Even with a special rate of 7s. 3d. per 1000 feet (the ordinary price being 8s. 4d.), his day business was not a success. The fact that the climate was so cool as to require artificial heat nearly all through the year told very much against it. Mr. Britton said that at Oakland he had over 1000 stoves out on separate meters, with a special rate of 7s. 3d. per 1000 feet; and the average consumption was about as stated in the paper. His plan was to fix the stove at a special cheap price; for instance, he put on a four boiler stove for 50s. inclusive. Careful attention to all complaints, and to making the stoves as efficient as possible, was a great step towards success. He did not think small companies could afford to sink much capital in stoves. Mr. Adams said that at Portland wood was sold at 9s. 3d. per cord, and between cheap wood and the careless Chinaman, it was hard to introduce gas-stoves. In reply to a question, Mr. Osborn expressed a strong preference for a uniform rate, so as to save the expense of a special meter and service for the stove. He made it a point to look carefully after the stoves.

Mr. J. A. Britton, of Oakland (Cal.), followed with a paper on "Municipal Ownership," which he regarded as a menace to all industries, and classed as "municipal theft;" for it was nothing more or less than legitimized confiscation of property, that would not be tolerated in the case of individuals. He confessed it owed its birth largely to intolerable and intolerant charges, to large profits, and to the desire of accumulating unwarrantable wealth taken from the masses. But this did not relieve the public from the onus of attempted confiscation. The agitation in its favour came from unthinking masses, led by demagogues who were actuated by personal motives rather than the public good. Busy hands and active brains had no time for the discussion of such questions; and it was the idle hand and irresponsible brain that were always finding fancied wrongs and promoting agitations. This class was particularly amenable to jealousy of those who rose to wealth by superiority of brain power, and talked about all men being created free and equal, as though it had also been ordained that they were to always remain so. He contrasted the dignified and courteous way in which the question had been discussed at the recent meeting of the Western Gas Association,* with the tactics adopted by the author of a paper read before the Street Lighting Association at New Haven,† who really seemed to think that a manager or director of a company was invariably dish onest and untruthful. They had endured this sort of thing long enough; and it was time for the gas manager to assert his rights, and take steps to prevent offensive and unwarrantable abuse. Municipal ownership, he contended, meant nothing less than the violation of a contract; for, in that State at any rate, the franchise was regarded as a property, and assessed as such. Capital had been raised on the faith of the contract, and on the fundamental principle of American Government that forbade the confiscation of property without due compensation; and municipal opposition must necessarily lead to the destruction of the property. In the discussion of this subject, sufficient stress was not laid upon the rights of the holders of this invested capital, the violation of which would surely lead to disastrous national consequences. After enlarging on these topics, the author went on to repeat some of the arguments which he recently had occasion to lay before the Board of Trustees of the city of Alameda on this subject. He pointed out that it was the duty of municipalities to

* See "JOURNAL," Vol. LXVII., p. 1462.

† *Ante*, p. 257.

encourage and protect private enterprise, which led to the investment of capital and the employment of labour, in every possible way; and they could not do so by entering into competition with it. The author then reviewed the effects of municipal ownership, as shown by actual examples. Without reflecting on the ability of men appointed on the Board of Trustees in any city, he contended that they could not devote the time and attention to details that directors of a company were accustomed to do; and frequently having no experience to guide them, it devolved upon the employees in charge to be guides and mentors of the Board, who were consequently entirely in their hands. The employees had, of course, to consider how to retain their positions. There was not the supervision that existed in the case of a private company, nor the same check against fraud. In many cases, therefore, the history of municipal ownership was simply one of the grossest mismanagement, leading to excessive taxation. A gas undertaking required great care and exact supervision, which it could not receive from a body of men who devoted a few hours per week to the business of which it was only a department. Municipal concerns were conducted at the expense of every taxpayer, unless each individual enjoyed the advantages afforded by it to an extent exactly proportionate to his taxation. At Alameda, for example, the electric light cost each taxpayer 4s. per year; but out of a population of 12,000, only 400 consumers used the electric light, and the cost of the public lighting was three times as much as the rate at which a private company could supply it. He contended that in no city in the States was lighting done so effectively or cheaply as by a private company; and he maintained that municipal ownership should be stamped out by legislation.

Mr. Powers, in the course of the discussion that followed the reading of the paper, said that the author had not at all overdone the case against municipal ownership; but according to the law of California, no municipality could grant an exclusive franchise to a company. But for this, he thought that one way out of the difficulty would be to pay the municipality an annual subsidy from the profits, in return for an exclusive franchise, as was done at Paris. The municipalities also had power to regulate their selling prices. They could therefore not only enter into competition with the companies, but could crush them by insisting upon unremunerative rates. What was wanted was a law that would protect the rights of the companies and guarantee them a fair return on their investments. Mr. Cline stated that at Los Angeles he had endeavoured to keep off the question by low prices. Mr. Burrows contended that no one should be permitted to vote on questions affecting the spending of public money, except those who actually had to pay it. If this was done, there would not be so much talk about municipal ownership. Mr. Gregory said it had been suggested that a law should be made which would force the municipalities, if they wanted an undertaking, to buy out the company at a fair price. Mr. Holberton thought this had been done, by agreement, in some of the Eastern States. Mr. Miller believed in a law preventing the municipalities from engaging in business. If purchase in any form was sanctioned, it would leave the holders of gas stocks in a very poor way. Mr. Britton, in reply, said that at Alameda the policy of cheap rates did not satisfy the municipality. He applied for a franchise, and offered to buy up the existing electric light plant and supply electricity at half the present price; but this was refused.

(*To be continued.*)

The Sanitary Institute Lectures.—The twenty-second course of lectures and demonstrations arranged by the Sanitary Institute for sanitary officers and students, will commence on the 22nd inst., and extend to the end of November. The course will be completed in eighteen lectures by specialists in the various branches of work; and, in addition, there will be thirteen inspections and demonstrations. Dr. W. H. Corfield, M.A., has been secured for a lecture on "Water Supply;" and the subjects of "Ventilation, Warming, and Lighting" will be handled by Dr. Louis Parkes. Among the works to be visited are those of the Southwark and Vauxhall Water Company at Hampton.

Utilizing London Clay for Reservoir Making.—The spoil brought to bank in the course of excavation works has not unfrequently been a source of trouble to contractors. The stuff must come out; and if it cannot be cleared away, a place has to be found for shooting it. There lies the trouble. This, however, does not seem to cause difficulty in the case of the borings now going on in connection with the new line of railway under the Thames from the Mansion House to Waterloo. The spoil is raised to a staging, and sent away in barges—not to be thrown into the river or the sea, but to be utilized; for it is not all rubbish. The railway tunnels are being made in the London clay; and this valuable material is, we learn, being disposed of to the West Middlesex Water Company for the construction of their four new reservoirs at Barn Elms. Two of them are already completed, a third will be finished this year, and the fourth next summer. The clay dug out of the river bed is being used for the central puddled walls of the reservoirs; and it is computed that something like 60,000 tons have been conveyed up the river from the staging at Blackfriars Bridge, and shot near the spot where it is to be used. In this way two important undertakings help each other.

THE DECOMPOSITION OF HYDROCARBONS BY HEAT.

(*Continued from p.* 459.)

A second experiment was carried out at the temperature of boiling zinc chloride—viz., 730° C. It lasted 1½ hours, and 57·05 grammes of hexane were used. The rate of flow and the rate of formation of gas were 2·5 to 3 times those of the previous experiment. A cubic centimetre of hexane was gasified, and 330 c.c. of gas were formed per minute. The products were: Liquid in the tar-collector, 15·55 grammes; collected in the paraffin oil, 5·40 grammes; gas, 35·42 grammes; while there remained unaccounted for, 0·68 gramme. The "tar" contained, according to the methods of estimation described earlier, 2·393 grammes of amylene and 0·914 gramme of benzene. The hexane unchanged therefore amounted to 15·55−(2·393 + 0·914)= 12·243 grammes; and the amount actually decomposed was consequently 44·81 grammes. The rate of flow being faster than in the earlier experiment, and amylene boiling at a lower temperature than hexane, a less proportion of olefines was found in this tar. The benzene absorbed in the paraffin oil was at most 1·38 grammes. The corrected volume of gas was 29·125 litres; and it had the composition shown in column 2 of the table [*ante*, p. 459]. Its specific gravity (moist) was ·940.

The gas was very similar in composition to that made at the lower temperature. Traces of acetylene were found in it; and the total amount of benzene from the 44·81 grammes of hexane decomposed was between 0·914 and 2·294 grammes. Little separation of carbon occurred; but the coil softened and contracted by the heat, so that the gas was brought into more intimate contact with the walls, while the period of its passage was lessened. A third experiment showed, however, that the difference in the rate of flow was of no moment.

For a longer experiment, the air-bath already mentioned was used; and its highest temperature was 820° C. In this case also the capillary began to contract; and during the last part of the 11¾ hours the experiment lasted, the process went on very slowly. On an average 0·3 c.c. of hexane was gasified, and 72 c.c. of gas were formed per minute. The products from the 143·1 grammes used were: Liquid in the tar-collector, 68·18 grammes; collected in the paraffin oil, 9·50 grammes; and gas, 63·82 grammes; while there remained unaccounted for 1·60 grammes. The specific gravity of the "tar" was ·674; and it contained 12·84 grammes of amylene and 2·90 grammes of benzene. There was therefore in it unchanged hexane to the extent of 52·44 grammes; and the quantity of hexane actually decomposed was thus 90·66 grammes. Fractional distillation of portions of the "tar" before and after bromination showed that amylene formed the bulk of the olefines. According to the method of estimation employed, there were 1·355 grammes of benzene in the paraffin oil, and therefore all the benzene formed from the hexane was between 2·90 and 4·255 grammes, or between 3·2 and 4·7 per cent. of the weight of hexane. A small quantity of the distillate from the paraffin oil showed by bromination 25·3 per cent. of olefines; while the "tar" contained 18 per cent.

The composition of the gas is shown in the columns numbered 3 of the table. Its specific gravity (moist) was 1·05, and the corrected volume was 51·2 litres. The total weight of olefines was 48·5 grammes; and their mean molecular weight, 41·35 grammes. The weight of paraffins was 15·7 grammes; and their extreme composition was (1) methane 21·80 and ethane 11·22, or (2) methane 31·25 and hexane 1·77—both making up the total volume of 33·02. Acetylene was found to the extent of 0·01 per cent. of the weight of hexane decomposed, and 3 per cent. of the hydrogen in the hexane was set free. The following shows the manner in which the hexane decomposed was distributed:—

	Grammes.		Percentage by Weight.
Olefines, liquid . .	12·84 } 61·34	..	67·70
,, gaseous . .	48·50 }		
Paraffins, gaseous . .	15·70	..	17·30
Benzene	2·90 to 4·26	..	3·2 to 4·70
Hydrogen	0·41	..	0·45
Carbon and acetylene .	traces	..	0·01
Undetermined in the paraffin oil—chiefly hexane and olefines	9·50 to 8·14	..	10·5 to 9·00
Loss	0·81	..	0·84
Total . . .	90·66	..	100·00

A consideration of these results elaborated the method of gas analysis for discriminating the paraffins already described. After allowing for sources of error, and making all legitimate modifications in the calculation, the ratio of olefines to paraffins remained too low. By the two equations given for the possible course of the decomposition, the ratio of olefines to paraffins is 4·38 : 1; and in the two experiments, the ratios actually found were 3·91 : 1 and 3·21 : 1. There is evidence that hydrocarbons of the hydrogen content of olefines are found among the paraffins, owing to their resisting the action of bromine. The assumption that these unattacked bodies are trimethylene hydrocarbons is plausible, as, by a transposition of the bonds, pentamethylene may be as readily formed as amylene.

The decomposition did not appear to be much affected by the difference of temperature; but a further experiment within the

same limits was made, in order to ascertain more precisely the nature of the olefines produced. A Winkler coil, charged with fuming sulphuric acid, absorbs amylene and propylene from a mixture of those bodies with ethylene; and the olefines left correspond closely in molecular weight to the latter hydrocarbon. Two coils were inserted after those already mentioned—the first being charged with fuming sulphuric acid, and the second with a solution of potash. The decomposition-tube was placed in a double-walled bath, the temperature of which was kept constant by molten zinc. It did not exceed 820° C. In five hours, 26·2 grammes of hexane had been gasified; but the tube contracted, and barely left a way for the vapour. There was a slight deposit of carbon in the tube. The slow rate of flow induced very thorough decomposition, and very little tar was made. The products were distributed thus: Liquid in the tar-collector, 2·90 grammes; collected in the paraffin oil, 3·60 grammes; taken up in the sulphuric acid and potash coils, 6·90 grammes; gas, 11·50 grammes; while there remained unaccounted for, 1·30 grammes. The corrected volume of the gas was 11·535 litres; and its specific gravity (dry) was ·77. Its composition is shown in columns 4 of the table. The mean molecular weight is 31·2; and the olefines must therefore be regarded as ethylene.

The course of the decomposition is really similar to that in earlier experiments, as the oxygen consumption of the paraffins agrees, and the mean molecular weight of the olefines would be that found before—viz., 39—if the olefines retained by the sulphuric acid were present in the gas. The olefines in the gas weighed 4·754 grammes; and those absorbed, 6·90 grammes—making a total weight of 11·654 grammes. A simple calculation makes the molecular weight of the olefines absorbed 47·3, and their volume 32·562 litres. On interpolating this figure in the results of the gas analysis, the composition of the gas prior to treatment with fuming sulphuric acid would be that shown in columns 5 of the table. This agrees closely with that of earlier samples. The amounts of "tar" and of distillate from the paraffin oil being very small, only a qualitative examination of them was made. They contained benzene and olefines. The equation, $C_6H_{14} = CH_4 + C_2H_4 + C_3H_6$, therefore, appeared to be confirmed.

An experiment was made with the coil embedded in a bath of iron filings; but, owing to a blunder, no record of the temperature attained was secured. The passage of the coil became closed through softening of the glass, and the test ended prematurely, and quantitative results were not obtained. The gas made had the composition shown in columns 6 of the table. Its specific gravity (moist) was 1. Traces of carbon were deposited in the tube; and the "tar" contained 2·4 per cent. by volume of benzene.

This concluded the experiments on hexane at low temperatures. For higher temperatures, there was first tried a wrought-iron tube of 0·24-inch bore made into a coil of 1½ turns. This was placed in a steel crucible and heated in a muffle furnace to about 1200° C., and the rest of the apparatus arranged as before. Soon after hexane vapour was passed into it, the tube became choked from deposition of carbon in its anterior portion. A tube of 0·4-inch bore was then chosen, and merely bent to the shape of a U. The highest temperature attained exceeded 1190° C., but not 1220° C. In 1½ hours, 60·75 grammes of hexane were gasified; but in reality the bulk of this was treated in the first 20 minutes, as thereafter the rate of flow was very slow, owing to carbon having been deposited in the heated tube. At the commencement of the experiment upwards of 1000 c.c. of gas was made per minute; but only this amount was produced during the last hour. No liquid condensed in the tar-collector; and the paraffin oil removed only 0·55 gramme, which had a strong odour of benzene when subsequently distilled off from the oil. The carbon close to the walls of the tube was graphitic in character; while that in the middle was loose and powdery. About 10 grammes of carbon containing some asphaltic bodies was removed from the tube. The composition of the gas is given in columns 7 of the table. The analysis shows that the greater part of the hexane had been resolved into its elements. Methane is the chief hydrocarbon; and it and hydrogen are the only constituents present in the gas in large quantity. Complete decomposition puts in the background all other reactions; 4·16 litres of the gas did not contain sufficient acetylene to yield an estimable amount of the silver compound.

At this stage, these researches were broken off. There only remained to be considered some photometric results which bear on work published by Mr. J. F. Tocher.* He investigated from a technical standpoint the production of gas from mineral oils, and from certain members of the paraffin and terpene series. Among the oils used was a naphtha of ·730 sp. gr., 39 per cent. of which distilled over below 100° C., and the whole of it below 150° C. It gave results as follows:—

Temperature, degrees C.	600	..	850
Litres of gas per litre of naphtha	451	..	625
Percentage of olefines in the gas	31·2	..	29·8
" " paraffins " "	47·6	..	48·7
" " hydrogen " "	17·4	..	19·1
Mean molecular weight of the olefines.	36·4	..	38·0
Percentage of residuals	11·4	..	5·1

* See "JOURNAL," Vol. LXIV., p. 600.

There is a difference in the ratio of olefines to paraffins here and that found in the researches on hexane. The explanation lies in the fact that Mr. Tocher used apparatus resembling that employed for the manufacture of gas from heavy oils. His two samples of naphtha gas gave illuminating powers equivalent to 43·5 and 42·2 candles per 5 cubic feet per hour. These correspond to 139 and 188 candle-hours per litre of naphtha.

A number of photometric tests on the hexane gas of which the composition is given in columns 1 of the table gave, on an average, 61·5 candles; and others on the gas of columns 3 gave 74·4 candles. These figures correspond to yields of 132 and 124·3 candle-hours per litre of hexane. But Mr. Tocher had only 11·4 and 5·1 per cent. of liquid residuals; whereas the hexane afforded 36·7 and 47·6 per cent. in the two cases quoted. Making deduction for the liquid products in both cases, the yields per litre of naphtha are 157 and 198 candle-hours; and per litre of hexane, 209 and 233 candle-hours. Moreover, the hexane gas had been cooled to — 10° C., and washed with ice-cold paraffin oil; while the naphtha gas had only been cooled to the ordinary temperature, and washed with water. Further, the "tar" from the hexane consisted chiefly of hexane and amylene, and had therefore high carburetting and gas-making values.

Hexane must rank high among oil-gas making materials, since it produces a gas which, after cooling to — 10° C. and washing with ice-cold paraffin oil, gives 61·5 to 74·5 candles for a consumption of 5 cubic feet per hour (or 84·5 to 90 candle-hours per pound of hexane), and along with the gas 37 to 48 per cent. of "tar" consisting of hexane and amylene. Hitherto too low a value has been set on hexane and similar materials, because they have been gasified in an unsuitable manner, and a gas containing only 30 per cent. of olefines produced, in place of one containing 50 per cent., which the experiments described in this paper have proved to be attainable.

REGISTER OF PATENTS.

Manufacture of Gas.—M'Ewen, T. G., of Leytonstone. No. 15,366; Aug. 15, 1895.

In the manufacture of gas according to this invention, a closed furnace or producer is employed. Coal is fed in through an opening at the top. It drops down on to an incline, from the bottom of which it passes on to a second incline below the first. From this second incline it falls on to a series of hollow fire-bars. These bars are perforated on their under side, and extend through the front of the producer; being open at their outer ends. Air enters through the open ends; and passing out through the perforations, it rises up between the bars, so as to combine with coke burning upon them. As the coal descends the inclines, it becomes highly heated; and gas is driven off from it, until it arrives on to the fire-bars in the form of coke. Fresh coke constantly replaces the coke that has been burnt. At each side of the fire-bars is a vessel to contain "mixed petroleum or other oil or fat, or it may be tar or the like and water." The gas produced by heating these mixed substances in the closed vessels escapes through perforated pipes, and mixes with the hot gases rising up from the burning coke. The mixed hot gases then rise up through the interstices in a chequer-work of fire-brick, carried by an arch which extends over the lower part of the lower incline. From the top of the chequer-work, it is made to pass between the top of the upper incline and the top of the producer; and from thence it travels over the coal on this incline, and down through a second chequer-work pile of fire-brick to an outlet. A spray of hydrocarbon oil is delivered on to the top of this second chequer-work pile of fire-brick, so as to further enrich the gas. Any oil passing down to the bottom of the pile is received into a tank at the bottom, and can either be again delivered as spray on to the pile of fire-brick, or used, together with water, in the vessels at the sides of the fire-bars.

Gas-Engines.—Briggs, F. H., of Torquay. No. 16,079; Aug. 27, 1895.

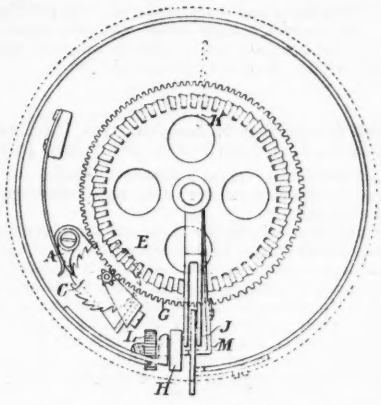
This invention relates to engines or motors worked by combustible gases or oil vapour or spray. It has for its object to provide apparatus in which a charge of combustible mixture is compressed in a separate chamber or chambers during one stroke of the piston or pistons; and, being then ignited, it propels the piston or pistons during their next outstroke—the products of combustion being expelled by the next instroke. The invention, however, is capable of providing an explosion at each stroke of the piston; the explosion not taking place in the cylinder itself, but in an explosion chamber communicating with the working cylinders by valves. The engine is also self-starting.

Coin-Freed Gas-Meters.—Glover, R. T. & J. G., of St. John Street, E.C. No. 16,271; Aug. 30, 1895.

This invention has for its object to enable the mechanism of a prepayment meter to be set to deliver (after the insertion of a coin) any fractional quantity of a cubic foot of gas; the method of changing for whole cubic feet, and the general construction of the apparatus, being as described in patent No. 25,272 of 1894.

In carrying out their present invention, the patentees propose to dispense with the ratchet-teeth on the periphery of the notched plate, and into which a pawl engages, as described in the previous patent, because the distances between such teeth represent approximately quantities of a cubic foot, and do not consequently allow the turning movement of the notched plate to be limited, so that a less quantity may be delivered. They therefore arrange that the pawl A engages the teeth of a ratchet-wheel C, separately mounted upon a spindle; and operated by the notched plate E, in any given ratio, by means of suitable mechanism—such, for instance, as a pinion gearing with spur-teeth G cut in the periphery of the notched plate. An adjustable stop H is also used in

connection with the delivery orifice of the coin-pocket, in order that it may be set to cause the coin to be discharged at the point corresponding to the given number of teeth over which the pawl is required to move; the number of teeth being the sum of the fractional quantity of gas it is desired to supply.

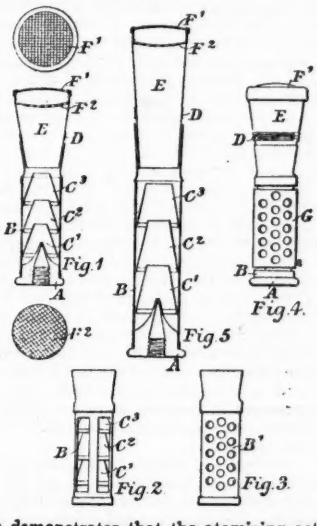


For instance, suppose that the coin is inserted into the money-pocket J through the slot K of the cover-plate (indicated by dotted lines), and the coin-pocket is turned to the position shown in full lines, the notched plate E will have been moved a distance of 25 notches, representing 25 cubic feet of gas. But if it is required to deliver only 24½ cubic feet, the stop H, after loosening the lock-nut L, is screwed out a distance equal to half a tooth; so that the coin-pocket can only move a distance of 24½ teeth, and then discharges the coin. It thus follows that the stop H can be so set as to allow the minutest fraction of a cubic foot of gas to pass; and the ratchet-wheel C, through being so highly geared, will prevent any "back lash" of the notched plate E, which would tend to nullify the minute setting of the stop.

In order that the period of discharge of the coin from the pocket may coincide precisely with the position of the stop, a spring shutter M may close the end of the money-tube J, the edge of which, when brought into contact with the stop, moves a slot opposite the coin-pocket, so that the coin will be discharged at the proper instant.

Bunsen Burners.—Thompson, W. P.; a communication from A. Bandsept, of Brussels. No. 17,927; Sept. 25, 1895.

In his specification, the patentee remarks that his improvements in gas-burners are based upon the atomization of a suitably proportioned mixture of gas and air introduced in the burner. He has found, by numerous experiments, that wire gauzes are the most useful for his purpose. The atomizing action is very sensible with two wire gauzes, when suitably chosen and arranged; and this action increases with each additional gauze. But as the resistance which these wire gauzes would oppose to the passage of the gas current is considerable, he combines the atomizer with a special injector, in which the velocity of the issuing jet is increased by gradually narrowing the inner section of the injecting nozzle, and then by progressively dilating the fluid. In this way, the quantity of air theoretically necessary for producing perfect combustion is introduced by a succeeding draught, by means of a series of conical tuyeres. A burner is thus obtained "capable of working automatically at the gas pressure usual in towns."



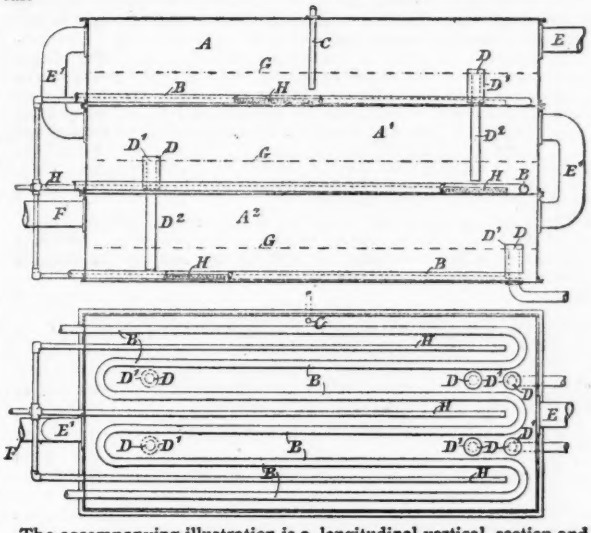
The patentee demonstrates that the atomizing action, which in an ordinary bunsen burner takes place in the preparatory zone of the flame, is performed in his burner by the wire gauzes, which exert a certain attractive power upon that part of the flame. Consequently a single wire gauze or wire gauzes which are not placed immediately under the flame, or which are not placed at the proper distance from each other, would be without any atomizing effect. The heat produced by the burners is said to be so great that the usual incandescent bodies would not resist for a long time. To overcome this difficulty, it is necessary to diminish the intensity of the flame without losing the advantage of a rapid and perfect combustion. To this end, the consumption of gas and proportion of the tuyeres are altered so as to increase the angle of expansion of the gas mixture. In this way, a section of flame is obtained "similar to that produced by a burner having a double combustion; while still obtaining a specially luminous effect, and the full preservation of the incandescent mantles in use."

The accompanying illustration shows the shape and proportions of the burners preferred, as determined by numerous experiments. Fig. 1 is a longitudinal section of the smaller type of burner. Figs. 2 and 3 are separate parts of same. Fig. 4 is an external view of the burner. Fig. 5 represents a larger type of burner.

The divergent tube E contains the atomizer, which consists of a dense wire gauze F^1 and a second wire gauze F^2 having larger meshes. A screw-thread D, cut in the divergent tube, is intended for the purpose of fixing the gallery. The conical tuyeres C^1 C^2 C^3 may be fixed between supports B (fig. 2), or in a cylindrical perforated body B^1 (fig. 3). A regulating ring G (fig. 1), provided with openings, surrounds the cylindrical body B or B^1, and permits the regulation of the exact quantity of air drawn into the burner. The saving of gas realized by these burners is, it is claimed, always "very perceptible, and often considerable." Whereas in incandescent lighting by means of the Auer burner, the carcel-hour requires 19 litres of gas, the same gas-nozzle provided with this burner requires only 9 litres at a pressure of 52 mm. of water, and consumes 104 litres of gas. This result is obtained when the burner is constructed as shown; and it applies more specially to the smaller type. At 35 mm., this burner consumes 87·5 litres for 9·25 carcels—that is to say, one carcel for 9·45 litres. At 25 mm., the consumption is 83·5 litres for 8·77 carcels—the carcel equalling 9·52 litres. Finally, at a pressure of 16 mm., and after having slightly opened the point of the injector, the burner consumes 93 litres producing 7·4 carcels, which corresponds to 12·16 litres per carcel. In general, the saving of gas is said to increase with the pressure, on the condition that the volume burned remains between certain limits, from 85 to 103 litres, in order to obtain the full intensity with burners having an effective height of about 7 cm.; the pressure varying from 25 to 52 mm. of water.

Enriching Gas by Means of Hydrocarbons.—Dvorkovitz, P., of Bishopsgate Street, E.C. No. 18,877; Oct. 8, 1895.

The object of this invention is to provide means whereby "a very efficient distillation of tarry or other matters can be effected, and when desired the enriching of gases be effected by means of the same apparatus."



The accompanying illustration is a longitudinal vertical section and a horizontal section of such a gas-enriching apparatus.

A closed vessel A is provided, having at its bottom coils B for steam or other heating agent, and a pipe C for feeding in the matter to be distilled. An outlet D is available to run off the residue after the products of distillation have been removed therefrom. Three such vessels are shown, A A^1 A^2; each succeeding vessel being at a lower level than, or beneath, that preceding it. The outlets D are covered by caps D^1 descending to near the bottom of the vessel at such a level that the tars run off from the lower part thereof where these tars are heavier. The inlets for tar—that is to say, the pipe C of the vessel A and pipes D^2 of the vessels A^1 and A^2—should descend to near the bottom of each vessel; and these pipes are of increasing area, so as to allow free travel of the tars as they become thicker.

The upper part of the vessel is provided with a passage E for the products of distillation, and (where a series of vessels is used) each of the other vessels is provided with a similar passage E^1 connected with the vessel next in the series. If the apparatus is to be employed for enriching gas, the vessel A—if only one be used, or the lower or lowest vessel if more than one be used—is provided with an inlet F for the gas, which passes over the layers of tarry matter being subjected to heat, and takes up the enriching hydrocarbons given off. The surface levels of these layers of tarry matter are indicated by dot-and-dash lines G.

In order to improve the action of the apparatus, the tarry matters may have air or gas admitted to them; and when the apparatus is employed for enriching gas, the gas used may be a small proportion of the gas, being enriched—the gas (or the air, where that is used) being passed into the vessels by perforated pipes H laid near the bottom of the vessels, and in proximity to the coils through which the steam or heating agent is passed.

Automatic Valve for Water-Pipes.—Barr, J., of Kilmarnock, N.B. No. 14,254; June 27, 1896.

This valve apparatus is constructed so as to automatically close a main or other pipe conveying water whenever the pressure becomes

greatly lowered through (say) the bursting of a pipe. The valve may be either a sluice-valve, or an equilibrium or double-beat valve, or any other suitable known kind of valve. For moving the valve, a cylinder with a piston is provided, arranged to operate by means of devices acted on by the pressure in the main or water-pipe. The constructive details of the apparatus are susceptible of considerable variation, to suit different cases and requirements.

Enriching Coal Gas.—Shadbolt, R. G., of Grantham, and Broadhead, J. W., of Elland. No. 5051; March 6, 1896.

This invention relates to a method of enriching coal gas during its manufacture by the aid of its own products.

The patentees, in their specification (which is not illustrated), say: "It is well known that coal gas in the earlier stages of manufacture deposits in the form of tar, oil, &c., the greater part of its heavy vapours, a small proportion of which, if retained, would have a material effect upon the resultant illuminating power of the gas; and we claim, by our method, to retain a portion of these vapours, which would, under ordinary treatment, be precipitated and absorbed in the tar."

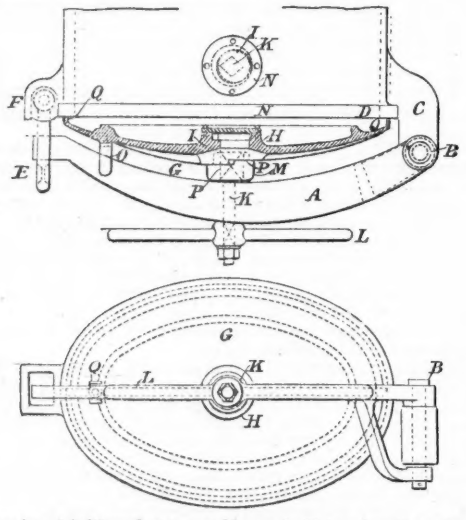
They propose to convey a portion of the partly purified gas—10 per cent., more or less, according to requirements—from a point generally found between the exhauster and purifiers (as usually placed), but varying with local conditions. The place required is "where the gas contains the lighter hydrocarbon or oil vapours after the extraction of the tar, or, in other words, where the gas contains the minimum of tar vapours with the maximum of oil vapours." From this point—taking advantage of the difference in pressures here and at the foul main, if the point be after the exhauster—a portion of the gas is returned to another point generally found between the hydraulic main and the condensers; the position of this point varying according to the quantity of gas being made. Under normal conditions, and with the maximum make of gas, the returning gas would be introduced somewhere about the condenser inlet; with a smaller make of gas, at a point nearer the retorts; and with the minimum make of gas, at a point possibly half-way or more back towards the retorts—taking care always that all the tar extracted from the newly-made gas is drained off previous to its reaching this point. Generally speaking, the temperature of the gas here will be between 100° and 130° Fahr., although, under normal conditions, the best results are obtained when the temperature is from 120° to 130° at the point where the returned and newly-made gases intermingle.

The inventors claim that the oil vapours contained in the returned gas prevent the precipitation of a portion of the heavier vapours still retained in the newly-made gas, which, if left to ordinary influences, would condense out and be deposited either as liquids or solids. These heavier vapours are saturated or blended with the oil vapours of the returned gas; and this being done in the presence of marsh gas, they are carried forward—away from the condensing influence of vapours already become liquid—and subsequently become fixed in the finished gas. Under certain conditions (as extreme cold, &c.), it is sometimes advisable to slightly raise the temperature of the returning gas; and, when necessary, this would be done by means of steam jackets, hot-air jackets, or other equivalent means.

The returning gas is conducted by ordinary pipes properly fixed, drained, &c., to a meter suitable in size and construction, where it is duly measured and conducted through one or more of the three or more branches to the point selected, as before mentioned.

Fastening the Lids of Retort Mouthpieces.—Winstanley, G., of Coventry. No. 14,877; July 4, 1896.

The accompanying illustration represents a sectional plan of a gas-retort mouth and lid, with a fastening device constructed according to this invention; also a front elevation of the same.



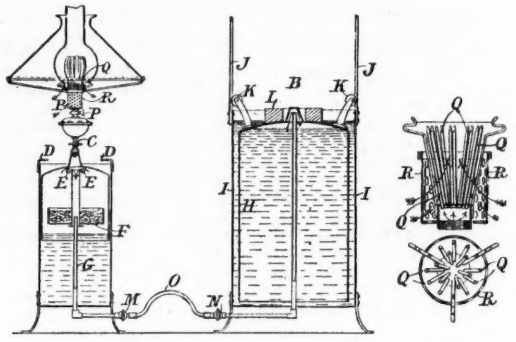
A cross-bar A is hinged at one end by a pin B to a lug C on the retort-mouth D; the other end being detachably secured by an open link E hinged to a pocket lug F, to facilitate its ready attachment or detachment in the usual manner. The lid G (shown elliptical) is formed with a central boss H, hollowed out in its back part, and bored to admit an eccentric I forming a part with the spindle K, which passes through the cross-bar, and is secured to the wrench lever L. A cam M, having two inclined faces P working against corresponding faces on the boss H, is mounted on the spindle K, and free to slide longitudinally thereon, but prevented from turning independently of it by square flats, or by a feather or other means—the back face of the cam being against the back of the cross-bar. The eccentric bolt K is secured in the lid by a cover plate N, which also prevents the entry of dirt or grit. A guide-fork O secured to the cover, and clipping the cross-bar, ensures their proper and constant relative positions.

In order to close the lid, the end of the cross-bar is secured in the link E and the lever turned. The inclined faces P of the cam M slide on the corresponding faces on the lid, and press the peripheral edge Q firmly against the face of the mouthpiece, while the eccentric I at the same time causes the edge to move on the mouthpiece face and clear away any foreign matter, so as to ensure a tight joint.

Production and Combustion of Acetylene for Illuminating Purposes.—Schülke, A. H. J., of Berlin. No. 14,929; July 6, 1896.

This apparatus consists of three independent devices—an acetylene generator, a gas collector or receiver detachably connected with the generator, and a burner.

The illustration below shows the generator combined directly with a portable lamp, which can be used independently of the gas collector or receiver. This collector is so arranged that it receives the surplus acetylene at a slightly higher pressure than that prevailing in the generator, and hold it stored ready for subsequent use in the lamp. The feeding of the acetylene to the lamp is effected by a reducing-valve or other pressure-regulator of any known construction. The burner consists of a number of open-ended capillary tubes, which produce small highly illuminating flames exposed to the free access of air.



A is the generator, which forms at the same time the body of the lamp; and B is the collector or receiver for storing the acetylene gas. The generator consists of a water-vessel, in which is placed a bell or gasholder closed at the top, and provided with a tap C; its upward movement being limited by stops D. Inside the cover of the bell are claws E, forming supports for the removable basket or open-work box F containing the calcium carbide. Through the bottom and contents of the generator passes a pipe G, open at its upper end. The pipe is intended to be connected detachably to the collector B; and so it terminates outside the vessel in a tap M, with a nozzle adapted to receive one end of a flexible tube O, the other end of which takes over the nozzle of the tap N belonging to a pipe from the receiver B.

On one part of the generator bell is a connection provided with a tap C, leading to a pressure-regulating apparatus placed above (shown only in external elevation), which acts by means of a diaphragm and valve, so that the acetylene passing to the burner-head P may be delivered at the lowest possible uniform pressure.

The action of the apparatus is as follows: The holders A and I are filled with water up to the level shown; so that the bells B and H dip into it. The bell B is then taken out, and the basket F removed, filled with carbide, and replaced in the bell, which is then returned to the holder A, the taps M and N being previously closed. On opening the taps C and P, the air is let out of the bell B, so that it falls until the carbide in the basket dips into the water. At the moment of immersion, the generation of acetylene commences, in consequence of the moistening of the carbide by the water; and the acetylene produced is conducted to the burner through the tap C, the pressure-regulator, and the tap P. As regards the action in combination with the receiver, which is put into communication with the generator by opening the taps M N connected together by the flexible tube O, the apparatus is so arranged that the bell B is subjected to a somewhat higher pressure than that at the burner, as regulated by the pressure-regulating apparatus, and the bell I of the receiver to a still higher pressure in comparison with the maximum pressure of the bell, by means of the weight L. By the generation of acetylene in A, the bell B is raised until the basket F with the carbide is lifted above the level of the water, but without the lower edge of the bell being raised out of the water, because the upward movement of the bell is limited by the stops D. By the continued generation of acetylene by the water adhering to the carbide, the pressure in the bell increases so that the acetylene passes through the pipe G into the bell H, which then also rises until the generation of acetylene ceases.

When, in order to burn the acetylene, all the taps C P M N are opened, the heavier loaded bell H sinks first, in its holder I, until the lower edge of the bell rests on the bottom of the holder, or is wholly immersed in the water. The pressure and volume of the acetylene in the apparatus then decreases gradually; and the bell B sinks also until the basket F with the carbide again dips into the water in the holder, and the generation of acetylene is resumed. The cycle of operations is repeated until all the carbide has been used up.

The burner itself is shown in vertical and cross section. It consists of very small tubes issuing from a gas-chamber Q. The outlet end of each tube is tapered off to a slender cone, when the tube itself is not of sufficiently small diameter. The tubes "must be placed at such a distance apart as will permit of the free access of air between them to the long jets of burning acetylene at the end of the tubes." The supply of air may be facilitated, if desired, by means of a chimney

placed immediately above the top of the burner-tubes; and the sheaf or bundle of tubes may be surrounded with a perforated casing R, to serve as a lamp-shade carrier.

APPLICATIONS FOR LETTERS PATENT.

16,277A.—PRATIS, L. V., and MARENGO, P., "Utilization of hydrogen gas, for the obtainment of light, heat, and power." Sept. 2.
19,167.—DRUEDING, L. H. A., "Devices for facilitating the lighting of gas-burners." Aug. 31.
19,172.—IRWIN, T. F., ATKINSON, J. J., and YOUNG, J. D., "Liquid filters." Aug. 31.
19,215.—STIENS, P., "Incandescent mantles." Aug. 31.
19,288.—BOULT, A. J., "Generating gas by the chemical action of a liquid upon a solid material." A communication from H. F. Fuller. Sept. 1.
19,332.—KRETSCHMANN, H., "Burners for heating purposes." Sept. 1.
19,366.—ROBERTSON, T., "Water-heating apparatus by gas-stove, which is adaptable also for cooking purposes." Sept. 2.
19,458.—SPOOR, J. J., "Reflector for gas-lights." Sept. 3.
19,472.—FANE, S. J., "Gas-brackets." Sept 3.
19,487.—BONNEFIN, F. H., and HANCOCK, D., "Mantles, caps, or hoods for incandescent gas lighting." Sept. 3.
19,522.—SONIS, V. H. F. DE, "Acetylene gas lamps." Sept. 3.
19,536.—BECK, G., "Incandescent mantles." Sept. 4.
19,599.—SIMKINS, E., "Coin-freed supply apparatus." Sept. 4.
19,632.—MARTIN, H. M., "Gas or oil motors." Sept. 5.
19,639.—LÉGÉ, A., "Electrical gas lighting." Sept. 5.
19,667.—WHITTAKER, W., "Mechanical stokers." Sept. 5.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Liability for Gas-Meters Destroyed by Fire.

SIR,—In a recent fire, a large gas-meter on hire was destroyed. It has been the practice of my Company to call upon the consumer to pay the value of the meter; but, in this case, the liability is disputed. Can you or any of your numerous readers say what is the general practice in these cases? I should add that no agreement was entered into pursuant to section 18 of the Gas-Works Clauses Act, 1871.

Sept. 7, 1896. SECRETARY.

Mr. Damon and the Evans Photometer.

SIR,—Mr. Sugg's arguments are very hard to follow; for the reason that he evades the point in discussion by introducing, in place of it, his opinion as to what is the position and duty of myself as a gas examiner and an officer of the London County Council.

It is curious as well as instructive, however, to note the outcome of this "*tinkering*" of which Mr. Sugg so unhesitatingly accuses me, and upon which he so strongly comments, in connection with the photometer at the Ladbroke Grove testing-station. In order to make my point quite clear, I will state briefly the changes that were made by me in my experiments on that instrument, and then what followed—

(1) The outside wooden case was removed. Result: Better ventilation, and less abnormal readings.
(2) The zinc gauze was also taken off. Result: Still better ventilation, and still less abnormal readings.
(3) Screens were then fitted to the photometer, the room darkened, and the doors left open, so as to make it as near an open bar as possible. Result: Still better ventilation, and normal readings.

The Gas Referees then made further alteration by cutting large openings, and inserting perforated gauze, directly beneath the gas and the candles, with the direct result that, although the doors of the photometer were closed during the testing, the candles showed far less tendency to gutter, and the gas-flame, which before the alteration was most unsteady, became remarkably steady.

Still further improvements have been made by fixing the candles, and substituting a movable sighting-box; and this "*tinkered*" instrument of the Ladbroke Grove pattern now appears in Mr. Sugg's catalogue of photometric apparatus (*vide* illustration, p. 2) as William Sugg and Co.'s *First-Class* Evans Photometer.

It is very apparent, therefore, that, if Mr. Sugg does not justify my experiments, he at any rate thoroughly appreciates their importance.

Mr. Sugg states as puerile my remarks that it is possible, by mechanical alteration, to both raise and lower the apparent value of the gas. I am not at all disposed to accept the term puerile in connection with so grave a defect, which most certainly does exist in the Evans photometer, and is practically demonstrated in the case of the Ladbroke Grove instrument, where the apparent value of the gas has, by mechanical alterations, been considerably reduced; while, in the case of the instrument at present in use in Dublin, it is raised some 1½ candles. If further proof is required, in support of my contention as to the unsuitability of the Evans photometer for gas testing, it is found in the fact that, one by one, they are being removed from the official testing-stations. Indeed, I think I am correct in stating that they have been removed from the testing-stations under the South Metropolitan Gas Company at the personal request of Mr. Livesey, owing to the difficulty experienced in obtaining concordant results with them.

With reference to Mr. Sugg's accusation of my making innuendoes against the late Mr. F. J. Evans, nothing of the kind was in my mind. I believe that Mr. Evans honestly considered his instrument to be the best form of photometer when he advocated its certification for the official gas testing-stations.

I will again inform Mr. Sugg, when he questions my right to make alterations on the photometer supplied by the Referees, that *I have never made alterations of any kind for official purposes.* What I did do, when I found it an utter impossibility to obtain anything approaching accurate results, was to make certain experiments, which were repeated at the special request of the Gas Referees. They afterwards certified the photometer in its present form, and directed all those under their jurisdiction in the Metropolitan testing-stations to be altered to the Ladbroke Grove pattern. This justification of my work speaks for itself. Equally so does Mr. Sugg's further improving on those alterations, and then calling it a "first-class" Evans photometer.

In conclusion, Sir, as you may be thinking that this discussion has gone far enough, I desire to emphatically state (I am sorry there is the necessity) that I have absolutely no personal feeling towards Mr. Sugg or his firm, who are, as everyone will admit, the most skilled makers of photometric apparatus in the world.

ALFRED F. DAMON,
Gas Examiner to the London County Council.

123, *Ladbroke Grove, W., Sept.* 12, 1896.

LEGAL INTELLIGENCE.

Dealing in Gas Stokers' Gloves Alleged to be Stolen.

At the North London Police Court yesterday week, William Wilks, 51, a greengrocer, of Wallis Road, Hackney Wick, was charged before Mr. Dickinson with feloniously receiving a number of leather gloves, the property of the West Ham Gas Company, well knowing them to have been stolen. Mr. Stephen Lynch appeared for the prosecution; and Mr. C. V. Young was for the defence. Mr. Lynch said that the prisoner had, according to his own admission, been dealing for a long time in gloves which had been stolen from the works of the West Ham Gas Company and the Beckton works of The Gaslight and Coke Company. These gloves were supplied to the stokers employed at the works; and those found in the prisoner's possession were quite new. Detective-sergeant William Kemp said that, in consequence of information which came to his knowledge, he went to Berger's Chemical Factory, Homerton, and had an interview with a Mr. Garson. On the previous Wednesday, in company with Detective Lee, he watched the gates of the factory. He then saw the prisoner drive up in a van with another man, and go into the place. In the van was a sack full of something. Shortly after, the prisoner hurriedly left the factory, and drove away; witness following. He drove to Wallis Road, where the sack was taken indoors. Witness went into the house, and examined the contents of the sack; and found that it contained 26 new pairs of gas-stokers' gloves. One pair was marked "W.H.G.C.;" from others the initials had been erased; and some apparently had not been stamped at all. Asked where he had obtained them from, prisoner said he bought them off the foreman, but he did not want to get him into trouble. Later on he said he had purchased gloves from stokers at Bromley, West Ham, and Beckton. He had also had them from the foreman at Bromley; but that person was now dead. Some that were brought to him were marked "G.L.C.C.;" and with those he refused to deal. He paid 8s. a dozen for the gloves, and sold them to Bergers, at Homerton. Cross-examined by Mr. Young, witness said the prisoner apparently carried on a respectable trade, and threw no obstacle in the way when asked to show the contents of the sack. He had been to the gas-works, but had not seen any notice as to the stokers returning gloves served out to them into store. Mr. Young said that the prisoner had acted *bonâ fide*. It was the practice of the foreman in the gas-works to issue every month a new pair of gloves to each stoker. The men usually made one pair last two months, and sold defendant the other pair. It was also evident that they looked upon gloves which had been used as perquisites. The prisoner had dealt very openly in the matter. Detective Kemp: The prisoner has been charged with receiving before. Mr. Young: Nineteen years ago, since which he has been in the employ of the Gas Company. Mr. Dickinson said he would remand the prisoner, and take a substantial surety for £100, or two in £50 each.

Stealing Money from a Prepayment Meter.

At the Greenwich Police Court, last Thursday, Mary Ann Elwin, of Edward Street, Deptford, was charged with stealing money on three occasions from an automatic gas-meter, the property of the South Metropolitan Gas Company. According to the evidence, William Knapp, one of the Company's collectors, went to 109, Grove Street, Deptford, where the prisoner then lived, in December, 1894, and found that the catch of the padlock of the automatic gas-meter had been broken. Gas to the value of 7s. 9d. had been consumed; but there was no money in the box. A new meter was put in; and a month later Knapp again went to the house, but failed to gain admission. On Feb. 19, 1895, he found the house unoccupied. Gas to the value of 10s. 2d. had been consumed; but no money was in the box, although the padlock (an ordinary one) was securely fastened. On Aug. 27 last he found by the meter at the prisoner's present address that 5s. 10d. worth of gas had been consumed; but 1s. 1d. only was in the box. Further evidence showed that prisoner possessed a key, which fitted the padlock. She pleaded guilty; and the Magistrate (Mr. Fenwick) committed her for 21 days' hard labour.

A Water-Rate Dispute.

A question of considerable local interest was raised in a case, or rather series of cases, which recently came before the Magistrates sitting at the Exmouth Petty Sessions. The proceedings were instituted by the Exmouth Water Company; and the point in dispute was whether the Company were entitled to impose a separate charge for water supplied to a water-closet or bath beyond the first. As a test case, it was decided to hear the summons taken out against Mr. Samuel Pullam Firth, a member of the Urban District Council. Mr. Sparkes, for the Company, said that the amount claimed was 2s. 6d.—made up of two sums of 1s. 3d., the charge for two quarters

for water for a water-closet on defendant's premises. The right of the Company to make this charge had sorely exercised the public mind in Exmouth; but the matter was one of transparent simplicity. Under section 31 of their Act of Parliament, the Company were empowered to charge in respect of every water-closet beyond the first the sum of 5s. per annum. From the evidence of Mr. George Beavis, the Manager of the Company, it appeared that, prior to Lady-day last, no charge was made for a second water-closet. In the case of the present defendant, one closet was situated in the house and the other out of doors. For the defence, Mr. Beal contended that the Act of Parliament must be construed most stringently against the Company. Under section 30, the Company were empowered to supply, and charge for, water for domestic purposes; and he asked the Magistrates to hold that water for closets came within the meaning of the section, and that the Company were bound to supply sufficient water whether there was one closet or forty. There was nothing more or less than a contract between the Company and the consumers; and it was not honest nor just that one of the parties to the contract should have the power of altering the terms after they had existed for 32 years—simply because, as he understood, there was in contemplation a transfer of the Company's business to the District Council. Mr. Sparkes said there was no contract between the Company and the consumers; but it was a matter on either side of statutory obligation. The receipts given for many years informed consumers that they were liable to be charged for water-closets; and the demand-note served before Midsummer, 1895, also bore an express intimation to the same effect. The Magistrates held that the Company had statutory power to make the charge, and issued an order against defendant. On the application of Mr. Beal, it was decided to grant a case for the High Court of Justice.

Devonport Corporation Water Supply.—In accordance with the recent resolution of the Devonport Corporation, Mr. G. H. Hill, of Manchester, has been consulted with reference to the proposal of the Corporation to acquire the undertaking of the Devonport Water Company. Mr. Hill has visited the works and the sources of supply on Dartmoor; and he will present his report at an early date. The present intention of the Corporation is to apply for parliamentary powers in the ensuing session.

Increasing Business in the Coventry Gas Department.—The statistics in the report of the Gas Committee of the Coventry Corporation for the three months ending on June 30 show a substantial addition to the business in comparison with the corresponding period of last year. The gas made was 87,621,000 cubic feet—an increase of 14,350,000 feet, or equal to 19·58 per cent. The gas-rental was £10,564—an increase of £892. The number of customers advanced by 194 to 6166; and 145 stoves were fixed—making a total of 1663 on hire. Contracts for coal are stated to have been entered into at slightly reduced prices; and a contract for tar has been made at an advance on last year's figure. The Committee add that prices for sulphate are lower than has ever been known; and the coke market is unsteady.

Good Advice to the Ratepayers of Hastings.—The incandescent gas-lamp has commended itself for street-lighting purposes to a leader writer of the "Hastings and St. Leonards Times;" and he imparts a little sound advice to the ratepayers thereon. He says: "Everyone who has recently passed along St. Helen's Road at night must be profoundly impressed with the beauty of the incandescent light now employed there. The Gas Company, desiring to extend the system of incandescent gas lighting, both for streets and houses, have fitted up several lamps in the road facing the Park; and the result is to considerably unsettle the minds of a good many who have hitherto held no doubt as to the superiority of electric light for street lighting. If, as the Gas Company assert, they can supply illumination by these lanterns at a cost far below that paid for electric lighting, the ratepayers would do well to carefully consider the question."

A Lucky Find for Dover.—Some very important water springs have just been discovered near Dover, in the course of operations by Mr. Edward Easton, of Westminster, the Engineer to the Dover Undercliff Reclamation Scheme, by whom it is calculated that at least five to six million gallons of the finest spring water are wasted daily—six times as much as is pumped for the whole of Dover. The water issues from fissures in the cliffs, and is derived from the same rainfall and gathering area which supplies the great flow of water on the shore between Dover and St. Margaret's. Mr. Easton has been engaged in sinking headings for water-works for a portion of East Kent, at Martin Mill, near Dover; and last Friday the men struck a new heading, and had only proceeded some few feet when the water burst in upon them in such quantities that they had to leave the shaft, and had not even time to save their tools. Two or three years ago the neighbourhood was visited by some Commissioners in connection with the London Water Supply, with a view to reporting as to the watersheds of the county.

Stratton and Bude Water Supply.—Local opinion is still very much divided upon the merits of the various schemes proposed for improving the water supply of Bude and Stratton. With the object of arriving at a decision, the District Council engaged the services of Mr. Baldwin Latham; and on Tuesday last they met to consider his report. Mr. Latham advised that provision should be made for a supply of not less than 90,000 gallons of water per day; this estimate being based on a probable consumption of 30 gallons per head by a population of 3000. Of the various suggestions which have been made, he considers that of an agreement with the Bude Canal Company, for the purchase of their undertaking, the most feasible. To go to Wrasford Moor, as was proposed by Mr. Anson, would mean, he says, the construction of a reservoir to hold 30 million gallons; and though this would afford an ample supply, it would be at great cost. For other reasons, he disapproves of the scheme for obtaining water by gravitation from sources nearer Stratton and Bude, and of the proposal that water should be raised from wells to be sunk near the town and pumped to a storage reservoir. The District Council decided to reopen negotiations with the Canal Company.

MISCELLANEOUS NEWS.

NOTTINGHAM CORPORATION GAS SUPPLY.

Annual Reports and Accounts.

We have received from the Engineer and General Manager of the Nottingham Corporation Gas Undertaking (Mr. W. R. Chester, M.Inst.C.E.) a copy of the reports and accounts of the department for the year ending March 31 last. The first report is that of the Gas Committee; and it deals generally with the results of the year's trading. Mention is made in the opening of the extreme mildness of the weather and the entire absence of day fogs during the financial year; but notwithstanding this, the Committee have the pleasure of announcing that there was a slight increase in the consumption of gas, due probably to the increasing use of gas for fires, cookers, engines, and many trade purposes. The consumption in the year was 1,486,123,700 cubic feet, against 1,474,368,000 cubic feet in 1894-5, or an increase of 11,755,700 cubic feet. The coal contracts, it is next stated, were let at a low rate; but the fall in price has, unfortunately, been more than discounted by the drop in the value of coke and sulphate of ammonia, which together account for a diminution in revenue of £7649—the price of sulphate being only two-thirds of that at which it stood two years ago, while coke at the present time is almost a drug in the market. The net profit for the year is £25,137, out of which the Committee propose to hand over £24,000 to the Finance Committee, to repay £1000 to the reserve fund, and to carry the balance forward. They also direct attention to the remarkable increase in the sum they have to pay in rates and taxes. The total amount at which these stood two years ago was £6281; while for the past year they amount to £10,036—being an advance of £3755, or equal to a little more than a penny in the pound of the town rates. The Committee conclude their report with a reference to the popularity which gas is acquiring as a motive power. During the year, they coupled up their pipes to fifty new engines; and they have other applications before them, which will, in all probability, lead to a very considerable increase in the use of gas for this purpose. The gas-engine, they remark, has now been brought to such a high state of perfection, that the cost of motive power is only about ½d. per horse power per hour with gas at 2s. 6d. per 1000 cubic feet; consumers who use it in large quantities obtaining it at a still lower figure.

The Committee's report is followed by that of the Gas Engineer. He states that the works have been kept in good repair throughout the year, and that their efficiency has been fully maintained. The distributory plant has received special attention; and a further extension of the mains has been made with the object of coupling up the different stations, so that the supplies from any one works may be temporarily taken up and maintained by the others. Extensions have been completed at the Giltbrook chemical works, which are in a high state of cleanliness and efficiency; all the operations being carried out to the entire satisfaction of the Local Government Board inspector. The total mileage of mains is 286·67; there having been 3·92 miles added during the year. The number of meters fixed to March 31 (including 338 lamp meters) was 40,339; being an increase of 1136 meters on the previous year. Of these 38,032 belong to the Gas Department; and 2307 to consumers. The demand for prepayment meters continues to increase. At the end of the year, 3251 of these were in operation; being an increase of 1058. New services to the number of 1320 have been laid, against 949 in the previous year. There are at present [the date of the report is May 21] about 4040 cooking-stoves in use, 4500 fires, and 300 engines, besides a very large number of other appliances of almost every description. Of the 4040 cookers in use, 3689 are rented from the department.

Annexed to the reports are the usual financial and working statements. The total receipts on capital account on March 31 last are shown to be £1,011,433, and the expenditure £1,005,529; so that there is a balance in hand of £5904. The outlay on this account during the year was £12,846.

From the revenue account, it is seen that the total income amounted to £238,136, which was produced from the following sources: Private gas consumption, £170,196; public lights, £9505; rental of meters, £5992; rental of stoves, £1584; coke and breeze (less labour and carriage), £21,426; tar and its products, £16,838; sulphate of ammonia, &c., £7968; refuse lime and oxide, £1082; meters and services, brass work, and material for distribution, £2265; gas stoves, fires, &c., £706; rents, £477; sundries, £63; and annuities, £31. The expenditure totalled to £165,360, as follows: Manufacture of gas, £128,484 (coal cost £74,736); distribution, £19,197; public lamp fittings, £70; rents, rates, and taxes, £10,518; management, £6206; law charges, £23; and bad debts, £861. There remains a balance of £72,775 for the profit and loss account, wherein it is shown that interest on loans, debenture stock, and consolidated stock, and annuities absorb £43,015; £500 is appropriated for depreciation of gas-stoves; £600 is carried to the sinking fund for loans and debenture stock, and £3522 to the sinking fund for consolidated stock—leaving the net profit for the year at £25,137.

Other statements supply the following particulars: On the trading capital account, there is a balance of £48,761. At the credit of the loans and debenture stock account, there is £3479; and at the credit of the consolidated stock sinking fund account, £42,999. The depreciation and insurance fund account (Giltbrook works) stands at £3500; the reserve fund and "rest" account, at £68,301; and the renewals account, at £466.

As to the manufacturing operations, the quantity of coal carbonized during the year was 152,656 tons, as compared with 150,769 tons in 1894-5. The gas made was 1,586,434,000 cubic feet, of an average illuminating power of 18·67 candles, as against 1,574,686,000 cubic feet in the preceding year. The amount sold was 1,486,123,700 cubic feet, in comparison with 1,474,368,000 cubic feet. The gas unaccounted for was 100,310,300 cubic feet (6·32 per cent.), against 100,318,000 cubic feet (6·37 per cent.). The estimated quantities of residuals produced during the year were: Coke and breeze, 91,973 tons (inclusive of 1389 tons of Wollaton ash); tar, 2,044,805 gallons; and ammoniacal liquor, 3,836,255 gallons.

BRADFORD CORPORATION GAS AND ELECTRICITY UNDERTAKINGS.

The Half-Yearly Statement.

At the Monthly Meeting of the Bradford Town Council last Tuesday, the usual statement was made by the Chairman of the Gas and Electricity Supply Committee (Mr. W. C. Dixon) as to the working of the departments under their charge during the half year to June 30 last. The minutes of the Committee included a proposal to extend the electric cables at a cost of £850, and a resolution reducing the charge for electricity supplied for motive power from 3½d. to 2½d. per unit from Jan. 1 next.

Mr. DIXON moved the adoption of the minutes, and, in the course of his remarks, said the gas-works were in a thoroughly good working state. All the old retorts had been replaced by new ones; and an old condenser, which had been in use about forty years, had also been replaced at a cost of £485, which sum was paid out of revenue. The Council had a capital outlay in connection with the gas-works of £612,000; and they had a profit for the half year—taking the works as a private concern—of £29,407, or 4·80 per cent., as compared with £26,468, or 4·35 per cent., in the corresponding half of 1895. After deducting interest and sinking fund, and the cost of lighting the street-lamps, which amounted to about £10,000, there was a net revenue from the gas-works of £6092, or 1 per cent., against £1665, or 0·27 per cent., last year. This net revenue was equal to a rate of 3d. in the pound, which he thought would be a help to the local Chancellor of the Exchequer. The lighting of the street lamps had cost in the half year £10,672, against £10,557 in 1895. This was equivalent to a rate of 5d. in the pound. During the six months, 805,600,000 cubic feet of gas had been made, as against 802,916,000 feet in the corresponding half of last year. The chemical works were in better working condition than ever before; a considerable part of them having been almost renovated. The old-fashioned horizontal lime-stills had been replaced by the most modern automatic vertical stills. The price of sulphate of ammonia had fallen to the lowest point on record; the average now being £7 17s. 6d. per ton, against £10 17s. 6d. last year. Nevertheless, he was still in a position to show a profit of £1456. Last year it was £4387. The capital outlay amounted to £9280. Copperas and sulphuric acid were fairly steady in price. The Electricity Department was making as rapid progress as the Corporation could desire; and the three-wire system had been completed practically throughout the borough. The Committee recommended that the price of electricity for motors should be lowered from 3½d. to 2½d. This reduction ought to be taken advantage of by merchants, printers, and all who required intermittent power. The Deputy-Chairman and himself were sparing neither time nor pains in attending to the works, and seeing that everything was carried on in an efficient manner. The new works were proceeding satisfactorily. In connection with the electricity department there was a trade profit for the half year of £3578, as against £3176 last year—or 4·24 per cent., against 4·73 per cent. There was a net profit, after deducting interest and sinking fund, of £1007, against £986 last year—or 1·19 per cent., against 1·47 per cent. The capital outlay amounted to £84,351, as compared with £67,112 last year. He had also to report the substantial increase in consumption of 35,954 units. The total net revenue from the gas, chemical, and electricity works to be handed over to the Finance Committee for the reduction of the rates was £8557, equal to a saving of 4d. in the pound for the half year. He thought this result ought to be considered satisfactory.

Mr. T. SPEIGHT seconded the motion, which was adopted.

THE DUBLIN CORPORATION BILL TO BE REVIVED.

The Gas and Water Clauses.

A Special Meeting of the Dublin Municipal Council was held last Wednesday to consider their position in connection with the Bill promoted by them in the last session of Parliament. The history of this ill-fated measure has been recorded in the "JOURNAL;" so that it is unnecessary to enter at any length into the discussion which occupied some four-and-a-half hours. A report was submitted by a Committee of the Whole House, in which they made a complimentary reference to the ability displayed by the Borough Surveyor (Mr. Harty), the Town Clerk, the Law Agent, and the City Treasurer in furthering the Bill. The Lord Mayor dealt at some length with the troubles which the Bill had encountered, and which led to its ultimate defeat; but he claimed that the Council had successfully established the justice of their demand for an increased payment from the townships for the water supplied to them. His Lordship moved the following resolution: "That the Committee of the Whole House be and are hereby reappointed for the purpose of examining into and authorizing the payment of the accounts and charges connected with the promotion of the Bill; that the Town Clerk is hereby authorized to insert all necessary notices, and the Law Agent to prepare a Bill in accordance with the terms of the Bill of last session, with additional clauses enabling the Corporation to recover six years' arrears of excess water-rate from the several townships scheduled in the late Bill, and sections extending the municipal franchise in a manner hereafter to be agreed upon by the Council; and that subject to such alterations, amendments, and additions as may be desired expedient, the Law Agent and the Town Clerk to do all things necessary and preliminary to the promotion of the said Bill in the session of Parliament next ensuing." Mr. J. J. O'Meara, in seconding the motion, dwelt at some length on the gas clauses in the Bill; and he charged the Special Gas Committee with not giving, in the formulating of the evidence in support of these clauses, the slightest assistance to the Special Committee in charge of the Bill. In the investigation of this subject, the Special Gas Committee did not give attention to a subject without the consideration of which this matter could never be settled. He referred to the question of burners. Let them have a photometer of the most perfect type, such as they sought in the Bill; yet with varying classes of burners they would have different results from the photometer. The burner prescribed to be used under the Act of Parliament was a fish-tail burner, passing 5 cubic feet of gas per hour. This definition was found to have a very varying interpretation. He had a test made by one of their own experts—a gas expert of the London County Council—and he tested the same gas with different flat-flame burners. He found the following results as regards the candle power of the gas: Argand burner, 17·3-candle power; batswing, 15·9 candles; Sugg's flat-flame table-top, No. 6, 15·6 candles; Bray's No. 7 fish-tail, 15·7 candles; iron fish-tail, 11·3 candles. They saw from these tests the varying results given by the same gas when different burners were used. They should, therefore, if they wished to have a final settlement, have all the instruments used carefully defined. He had heard it stated before the Parliamentary Committee that no charges were made against the Gas Company. This certainly came as an astounding surprise upon him, Alderman Meade, and other members. He thought it was high time for the Council to take this matter out of the hands of the Special Gas Committee, who might be prejudiced, and were not desirous of having the question settled. The Gas Committee should be dissolved; and the Council themselves ought to deal with the matter. The Sub-Committee of the Council were not to blame for the futility of the action of the Corporation in reference to the gas clauses; and they disclaimed all responsibility for their origination. With regard to the water clauses, they had passed Committees of both the House of Lords and the House of Commons. It was admitted that the townships were not paying enough for the water supplied to them. They had a loss from Blackrock of £750; from Bray, of £1022; from Clontarf, of £310; from Dalkey, of £237; and from Kingstown, of £1163. The loss of the Bill meant a loss to the city of £3562. A long rambling discussion followed, in the course of which two amendments were proposed; but the resolution was eventually passed by 18 votes to 16.

AUSTRALIAN GASLIGHT COMPANY.

The 121st Half-Yearly Meeting of this Company was held on July 27 when the report of the Directors—signed by Mr. George J. Cohen, Chairman, and Mr. Robert J. Lukey, Secretary—was presented, together with an abstract of the accounts. The profit for the half year January to June, after making provision for bad and doubtful debts, deducting interest on borrowed money, repairs and renewals, depreciation of plant, working expenses, and all other charges, amounted, with the balance brought forward, to £53,100. The Directors recommended the payment of a dividend for the six months of 9s. per share, which absorbed £51,135; leaving a balance to be carried to the next account of £1965. The stoking machinery for head station, mentioned in the report for June, 1894, was stated to be complete, and working very satisfactorily. The Engineer (Mr. Thomas J. Bush) reported that the Company's plant had been fully maintained, and was in a thoroughly efficient condition. The capital of the Company consists of 113,633 shares of £6 each, or £681,798 in all. There is a reserve fund of £110,450; and a reserve for replacement of meters and cookers of £9969. The Company's fixed investment—land, buildings and machinery at the head and out stations, mains and services laid, implements, and furniture—amounted to £1,052,256; and the stores investment—coals, residuals, apparatus in hand, meters, lamps, and pillars—was £172,750. The profit and loss account as given is very meagre; consisting, so far as the working of the period under review is concerned, of only three lines on the debtor side of the account and one on the credit side. The cost of the manufacture and distribution of gas, repairs and renewal of plant, management, &c., is given as £84,851; lighting and repairing public lamps, £7162; and miscellaneous charges, interest on debentures, bad debts, &c., £11,834. Against this total expenditure of £103,847, the revenue from sales of gas, &c., is given as £150,721. Including in this the undivided balance from the previous half year of £6226, there was, as stated above, an amount of £53,100 to be dealt with.

HARROW AND STANMORE GAS COMPANY.

The Half-Yearly Meeting of this Company was held yesterday week at the Albion Tavern, Aldersgate Street, E.C.—Mr. JAMES GLAISHER, F.R.S., in the chair.

The SECRETARY and ENGINEER (Mr. J. L. Chapman) read the notice of meeting; and the report and accounts were then submitted.

The CHAIRMAN said that, in common with the experience of other gas companies, the sale of gas at the beginning of the year was much less than in the corresponding period of 1895, owing to the severity and dulness of the weather at that time in comparison with the brightness of the three months up to Lady-day of this year. The consequence was they found that in Harrow and Stanmore together they sold in that quarter something like 700,000 cubic feet of gas less than the quantity consumed in the same months of last year. Taking, however, the Midsummer quarter, at Harrow they sold 600,000 cubic feet more than in the June half of 1895; and at Stanmore it was estimated that they also sold 116,000 feet more. Therefore, they were progressing at both places. In looking over the accounts, he found that the total gas-rental for the half year, including the meter, stove, and fittings rentals, was £4412 at Harrow, and £1257 at Stanmore. These figures gave them the relation between the business at Harrow and Stanmore; and in future they would be useful in comparing the progress in the two districts. Altogether the total rental was £5669; while in the preceding year, it was £498 less. As to the residual products, again in common with other gas companies, coke had failed them to the extent of £105. Sulphate of ammonia had also yielded a lower amount than he had ever known it return; and the result was they received for residuals £141 less than in the corresponding half of last year. Adding, however, the £896 produced by the residuals, they had a total revenue of £6566, which was £357 more than in the corresponding half of 1895. The manufacture of gas cost £3312, or an increase of only £3, notwithstanding the additional consumption of gas. The total expenditure

was £4405; while at June, 1895, it was £4324. The profit of the half year amounted to £2161, against £1886, which was an increase of £275. Looking at the profit and loss account, it would be seen that they had had to pay something more for temporary loans; and to pay the usual dividends, they would have to take £54 from the undivided balance of profits. Had the return for residuals been the same as hitherto, they would have had sufficient profit for the usual dividends, and about £100 to the good. The number of services they were continually connecting to their mains indicated that the business was progressing satisfactorily. He had much pleasure in moving the adoption of the report and balance-sheet.

Dr. J. W. Lee Glaisher seconded the motion.

The Chairman, in answer to Mr. Horace Rydon, stated that the Directors were encouraging the prepayment system in every way; and from their experience, they had concluded that it was a success.

Mr. Chapman added that they had now 150 prepayment meters fixed. In his opinion, the system required careful extension; but it answered well if properly managed.

The motion was unanimously carried.

Dividends for the half year were then declared, at the rate of 7½ per cent. per annum on the original "A" capital, 7 per cent. on the additional "B" capital, 5½ per cent. on the additional "C" capital, and 6 per cent. on the guaranteed shares, all less income-tax.

In eulogistic terms, the Chairman proposed a vote of thanks to Mr. Chapman, which was cordially passed. Afterwards, the close attention which the Chairman and Directors devoted to the Company's interests was also acknowledged. In responding, the Chairman mentioned that he had presided over the Company since 1872.

PROVINCIAL GAS COMPANIES.

At the half-yearly meeting of the Abingdon Gas Company last Wednesday, the report presented showed a balance of £794 net profit, out of which it was resolved to pay dividends of 6s. 3d. on the original shares and 4s. 4½d. on the "B" shares, which will absorb £427. It was also resolved to put £150 to the capital account, and carry £216 forward.

Presiding at the recent half-yearly meeting of the Derby Gas Company, Mr. H. Swingler stated that the accounts continued in a satisfactory condition. During the six months, the Directors had spent £4175 in various works; and the new works were steadily progressing. The sulphate plant was working satisfactorily and economically; and it was hoped that the retort-house would be in operation in October. There had been an increase in the quantity of gas supplied of something like three-quarters of a million cubic feet, which was considerable when one remembered how severe the weather was in 1895, and compared it with the extraordinarily mild weather of this year. A considerable portion of the increase had also been derived from public lighting. There was a total loss of £1070 on residuals, owing to the decrease in the price of these commodities. The coal account had, however, been reduced by £1384, against the corresponding payments of 1895. The result of the half year's working was that the Directors were enabled to pay the statutory dividends, and carry forward a very satisfactory balance. The report was adopted.

The annual meeting of the Falmouth Gas Company was held on the 3rd inst.; and the financial statement presented by the Directors discloses continued prosperity. The consumption of gas has increased; and the Directors have reduced the price 2d. per 1000 cubic feet as from June 30 last—making it 3s. 4d., less discounts. The works have been maintained in good condition; and in order to meet the increasing demand for gas, a new bench of retorts has been erected. In their report, the Directors have to defend the quality of the gas, which, owing to the old-fashioned tastes of the members of the Corporation, is wrongly considered by many persons to be of inferior illuminating power; while as a matter of fact, it is of higher power than that supplied by any other company in the country. Last year the Company went to the expense of experimenting with incandescent gas-lights in the Market Place; and the increased light (obtained at less cost than under the old system) was obvious to everyone. Yet, the Corporation preferred to return to the ancient lights! Looking at the revenue account, it is found that the total revenue for the year was £6520; and the expenditure, £4167—leaving a balance of £2353. The amount at the credit of profit and loss account, subject to the dividend for the second half of the year, is £2088. Statistics as to the manufacturing operations (which are under the control of Mr. J. W. Buckley, Assoc. M.Inst.C.E.) show very successful working. The quantity of gas made in the year was 31,745,000 cubic feet, as compared with 30,612,400 feet in 1895. The coal carbonized amounted to 3042 tons, as against 2937 tons; and the gas made per ton was 10,434 cubic feet, against 10,423 feet. The quantity of gas sold was 29,552,200 cubic feet, compared with 28,346,200 feet, or an increase of 4·25 per cent. The consumption through coin meters was 1,573,200 cubic feet, as compared with 910,600 feet in 1895. The gas sold per ton of coal carbonized was 9714 cubic feet, in comparison with 9651 feet in 1895. The total accounted for was 30,160,100 cubic feet, as against 28,999,000 feet; the percentage unaccounted for being 4·99, which was a reduction of 0·27 per cent. on the year. In moving the adoption of the report at the meeting, the Chairman (Mr. R. M. Tweedy) made some remarks as to the proposal of the Corporation to purchase the Company's property; and reference thereto will be found in another column. The motion was passed; and a dividend at the rate of 14 per cent. per annum for the past six months was declared—making 12 per cent. for the year.

Addressing the shareholders at the meeting of the Hastings and St. Leonards Gas Company on the 3rd inst., the Chairman (Dr. Gray, J.P.) made feeling reference to the decease of the late Chairman (Mr. G. A. Thorpe), who for 26 years had been a Director of the concern. Commenting upon the report and balance-sheet, which were noticed in the "Journal" for the 1st inst., Dr. Gray said that, notwithstanding the reduction they made of 2d. per 1000 cubic feet, they had not only paid their way during the half year and made the usual dividend, but had earned an extra ¼ per cent., and carried forward £600. This was decidedly a matter for congratulation; and if they compared it with what other companies had done, their position would be found to be almost exceptional. When the reduction of 2d. was made, it was estimated that it would cause a decline in the revenue of £1400; but the mild weather had made the decrease still greater, adding another £400, and making the actual reduction £1789. All the decrease occurred during the March quarter; but it had since been continually increasing over the corresponding months of the previous year. In 1895 there was an increase over 1894 of no less than 6 per cent.; and the present month showed an increase of 3¼ per cent. Under the head of residuals, there was a decrease of £1800, which was owing to the fact that they had practically cleared out their stock. It must not be looked upon entirely as a loss, because considering the losses other companies had sustained by having large stocks of residuals, the course adopted by the Directors in face of the coming winter, in selling all they possessed before the price dropped lower, was a wise one. The great number of gas-stoves now in use must throw a lot of coke on the market; and what they lost in one way, they gained in another. The oil-gas plant they were erecting would, it was hoped, be in working order in about a month's time, and it would enable them to use coke instead of coal. In conclusion, the Chairman said the present position of the Company was most gratifying, as was evidenced by the record prices the shares fetched both locally and on the London markets. The report was adopted.

At the annual meeting of the Keswick Gas Company, the Directors presented a report which showed a balance to the credit of revenue account of £1080, which, with £614 brought forward and a small amount for bank interest, made a sum of £1697. After setting aside certain amounts for various purposes, £1302 remained for distribution. The Directors proposed dividends at the rate of 8½ per cent. per annum on the original capital, and £5 19s. per cent. on the additional capital. These will absorb £836; leaving £462 to be carried forward. The report also stated that the new gasholder has been satisfactorily in operation since December last; and during the past year, the carbonizing plant has been increased by the addition of two new benches of six retorts each on Chester's regenerative system. The adoption of the report was moved by Mr. J. S. Harker; and afterwards Mr. J. Hepworth congratulated the Directors on the improved report—adding that he had not seen a better in the past in connection with the Company. The report was adopted; and recognition was made of the attention which the Manager (Mr. T. Heywood) gave to the affairs of the Company.

It was reported at the recent annual meeting of the Milnthorpe Gas Company, Limited, that the consumption of gas for the past year for lighting purposes amounted to 1,383,500 cubic feet, and for heating to 322,200 cubic feet. As compared with the previous year, this was an increase of 303,400 and 111,400 cubic feet respectively. The percentage of loss (including the gas used in the Manager's house and on the works) was 7·82; being the smallest for many years. The net profit on the working of the year was £169; and the Directors recommended that a dividend of 9s. per share, free of income-tax, be declared. This was unanimously agreed to. Before concluding the proceedings, the Chairman (Mr. J. Holme, J.P.) thanked the Manager (Mr. J. W. Wynn) for the energetic manner in which he had performed his duties, and presented him with a cheque.

The half-yearly report of the Sutton (Surrey) Gas Company shows that, although the volume of business has been maintained, the reduced price of the gas has resulted in a diminished return to the extent of £350; while residuals have declined by nearly £270. The total amount of gas sold was 41,266,000 cubic feet to private consumers and 3,455,000 cubic feet for public lighting, for which output 4732 tons of coal were used. The balance carried forward to the profit and loss account was £1943. The Company declare dividends at the rate of 10 and 7 per cent. per annum on the original and additional capital, less income-tax.

The Tonbridge Gas Company are showing very successful results. In the June quarter of last half year, they had a large increase in the consumption of gas, due chiefly to the cooking-stoves (about 200 in number) and 150 prepayment meters fixed in the six months. To provide for the increased demand, the Directors have decided to extend the retort-bench; increasing the productive power by 50 per cent. The profit and loss account shows a balance of £1316, from which £1042 is to be distributed in dividend. The dividends are at the rate of 10¾, 7¾, and 5 per cent. per annum on the several stocks. Two reductions of 2d. per 1000 cubic feet have been made in the past eighteen months. At the recent meeting of the Company, considerable discussion took place as to the desirability of applying for a Provisional Order to enable the Company to supply electricity within their area; but the matter was allowed to remain over until it was seen what steps the District Council intend to take. The Engineer and Secretary (Mr. James Donaldson) was heartily thanked for the interest he has taken in the Company's welfare.

At the recent annual meeting of the Whitstable Gas and Coke Company a dividend of 4 per cent. for the half year was declared and 1 per cent. of the profits added to the reserve. The Manager (Mr. T. G. Browning) stated that considerable progress had been made with the introduction of slot meters. There was an increase of 63 consumers during the year; while, as a result of the last exhibition of gas appliances, the number of gas-cookers on hire was increased by 84.

Increasing and Protecting the Torquay Water Supply.—At a special meeting of the Torquay Town Council last Thursday week, it was decided, by 18 votes to 3, to promote a Bill in Parliament to enable the Corporation to increase and protect the water supply, and to purchase the lands and premises forming the watershed around the streams at Trenchford and the storage reservoirs at Kennick and Tottiford, including the water rights connected with these streams. The cost was given as £40,000, involving an annual charge of £1612 10s. In 1893 and 1894, there was a decrease in the annual sum payable on existing loans, owing to consolidation, of £2404; and this amount, it was stated, would be available for payment of the £1612 10s., and leave a surplus of £791 10s. for other purposes.

NEW GAS-WORKS AT PONTYPRIDD.

New gas-works which have been erected by the Pontypridd District Council at Treforest, were formally opened last Wednesday by Mr. Patrick Gowan, the Chairman of the Gas Committee, in the presence of members of the Council, officials, and others. The old gas-works in Pontypridd were purchased four years ago by the Council for £35,000; and in order to meet the requirements of the rapidly increasing district, it was decided to build new works, which are computed to cost £40,000. It is estimated that a saving of at least 20 per cent. will be effected in the cost of making gas by means of the new plant; and, consequently, the charge to the consumers will very shortly be reduced. At present it is 3s. 10d. per 1000 cubic feet to small consumers, and 3s. 4d. to large. The new works include a telescopic holder, which has a capacity of about 350,000 cubic feet; being three times that of the two old holders. It is 100 feet in diameter, and has two lifts 24 feet deep. It was supplied by Messrs. C. & W. Walker. The retort-house is a large substantial building; its size being 115 ft. by 64 ft., with coal-stores, 30 feet long, immediately adjoining. The house contains four benches and 64 mouthpieces. The new works have been erected from the designs of Mr. Thomas Newbigging.

SOWERBY BRIDGE GAS SUPPLY.

Reduction in Price—Successful Administration of the Department.

At the last Meeting of the Sowerby Bridge District Council, the Gas Committee reported that, having considered the proposal to reduce the price of gas referred to them at the previous meeting, they now recommended that from Oct. 1 next the prices charged be as follows: Sowerby Bridge (in-district), 2s. 3d.; out-districts, 3s. 1d.; Luddenden Foot and Brearley, 3s. 6d.—with the usual discount.

Mr. W. Wilson, in moving the adoption of this report, explained that these reductions would reduce the income by something like £1000; but if coal remained at its present price, they would still be on a safe foundation. The Council, and the town at large, were to be congratulated upon the prosperous and satisfactory condition of the department. They had spent, since they purchased the works, about £70,000—loans and money taken from profits; and the works now "stood them" at about £25,000. Thus they had standing to the credit of the town more than £40,000 in the gas-works, which was equal approximately to £4 per head of the population. There was, he believed, no town in the kingdom which was more favourably situated than Sowerby Bridge as to its gas supply, or which had gas-works on a sounder basis. He was not aware of another town of the same size which was selling gas at 2s. 3d. per 1000 cubic feet, with 10 per cent. discount, which brought the price down to 2s. This was a very healthy condition of affairs; and it had been brought about by economical and careful administration, as well as by excellent management at the works and good workmen. It was not long since the leakage was 20 per cent.; but now the average was only about 5 per cent. As to the consumption, fifteen years ago it was 50 million cubic feet, while now it was close upon 100 millions. This increase had been a considerable factor in enabling them to reduce the price of gas. There were proposals before the Committee for further extending the consumption by introducing cooking-ranges and automatic meters. There were hundreds of householders in the town who did not consume gas even yet; but he trusted they would shortly.

Mr. Horsfall seconded the resolution.

Mr. Lodge expressed his satisfaction with the reduced prices recommended by the Committee. So far, however, as he was concerned, he should have been better pleased if they had gone a little farther. When the Luddenden Foot works were acquired, there was an understanding with the Local Government Board that they were not to charge the consumers there a different price to the Sowerby Bridge Gas Act outside price. Had the purchase of these works turned out a good bargain, they might have been in a position to sell gas there at 1s. 6d. Did it stand to reason, however, that they would in that case have charged Luddenden Foot people 1s. 6d., and Sowerby Bridge 2s. 6d.? He maintained that they would have levelled the two. Seeing that they had made a bad bargain, and that they could not manufacture gas there for less than 3s. 6d., he submitted that they should bear the difference in Sowerby Bridge. Another thing the Council ought to secure was that their employees at Luddenden Foot worked the same hours, and were paid the same remuneration, as the men at the Sowerby Bridge works. He moved, as an amendment, that the men be employed on equal terms, and that all gas consumed outside the district, whether manufactured at Luddenden Foot or Sowerby Bridge, be sold at a uniform rate.

Mr. Greenwood, although there was no seconder, obtained permission to say a few words on the amendment. When, he remarked, the Luddenden Foot works were acquired by Sowerby Bridge, the charge there for gas was 6s. Seeing, therefore, that they had gradually reduced it to 3s. 6d., he could not agree that the Luddenden Foot consumers had been at all badly treated.

Mr. Lodge proposed a second amendment, to the effect that a uniform discount of 5 per cent. be allowed to all consumers of gas, instead of the preferential discounts, varying from 10, 12½, and 15 per cent., now allowed. He said that the gas sold last year realized £12,454; and the discounts reached a total of £1341. Of this latter sum, sixteen firms received £565 at the rate of 15 per cent.; and sixteen received £120 at the rate of 12 per cent.—leaving £765 for the general body of consumers at the rate of 10 per cent. There was £850 paid for gas upon which there was no discount allowed, owing to the fact that, being unable to pay their accounts in time, these consumers had lost all claim to it. The change he proposed would result in a great saving to the town; and with the money thus obtained, the Council would be enabled, not only to abolish all meter-rents, but to establish a fund to buy up private meters.

There was also no seconder to this amendment.

Mr. Wilson, in reply, observed that with some of Mr. Lodge's remarks he had a certain amount of sympathy; and it was highly probable that, by-and-by, some of his proposals would be accepted. The Council had to bear in mind that the large consumers took about one-third of their supply. If, therefore, they were to do anything to anger them, and they stopped their custom, the result might be to affect the Council's interest very considerably, because it was through the large consumption that the cost of production had been so reducedas to enable them to sell gas so cheaply. Comment had been made as to the conditions under which the men at Luddenden Foot were employed. The men, however, made no complaint; and to adopt the eight-hour system would mean an increased cost equivalent to the reduction in the price of gas now recommended.

The report was adopted.

THE FALMOUTH CORPORATION AND THE PURCHASE OF THE GAS-WORKS.

The Views of the Gas Company and Others.

Under the heading of "Provincial Gas and Water Companies," some figures are given as to the working of the Falmouth Gas Company during the year ending on June 30 last, and allusion is also made to the speech of the Chairman (Mr. R. M. Tweedy) at the annual meeting on the 3rd inst. The main part of his remarks was directed to the proposal of the Corporation to take over the Company's concern; and they seem to indicate that the Corporation have not grasped the magnitude of the purchase which they are proposing to make. It is also clear that public opinion is against municipalization—at all events at the present time, and that the ratepayers do not set a very high value on the intellectual and business capabilities of the Corporation. This is what a local paper says of them: "There are corporations and corporations; and our chief governing body, it is sad to relate, has never excited the millennial expectations of the ratepayers. It is not the fault of the well-managed Gas Company that our town is so badly illuminated at the present time. Chief blame for this is attached to the Corporation, who declined to introduce more modern inventions such as the incandescent burner." Returning to Mr. Tweedy's speech, he said that their Act of Parliament empowered the Corporation to purchase on terms submitted by an arbitrator. It would be rather a bold stroke on the part of the governing authority of a small town like Falmouth to take over such works as those the Company owned. Possibly the idea was started without those who conceived it thinking what the cost would be. He understood that some of the members of the Corporation had already talked about giving £30,000 for the works (laughter); but he should be very much disappointed if a very much larger sum than that had not to be paid. The Corporation had gone so far as to employ a Mr. Silverthorne to inspect the plant on their behalf, and that gentleman had gone over the works, and seemed to be very well pleased with them. Seeing the heavy price which would have to be paid for the works, and the position of gas companies generally at the present time, owing to the advent of other illuminants, he (Mr. Tweedy) did not think it would be wise on the part of the Corporation to effect a purchase. The Corporation would be indulging in a very risky bit of speculation if they purchased the works. Go-ahead in some matters, they were very slow in other things, one of which was in regard to the question he was referring to. The Company had, at different times, gone to considerable expense in order to show the councillors how much better the town could be illuminated by the use of incandescent lights; but their endeavours had been fruitless. He did not think the ratepayers would derive much benefit if their public representatives had the control of the works. To be profitable, such concerns must be well managed; and that meant the expenditure of a good deal of time. Speaking as a ratepayer, he was not at all in favour of the purchase being effected; but as a shareholder he did not mind. This year the Company had done very well, in consequence of the low price of coal—a state of things which would probably not exist for many years more; and they had thus been able to make a reduction of 2d. per 1000 cubic feet. Mr. J. Mead also made a few remarks on the subject. As a shareholder, he favoured the idea of the Corporation taking over the works; but, as a ratepayer, he was disinclined to agree with the proposal, believing that the Corporation would find it difficult to make both ends meet. If the Corporation acquired the property with the idea of making a profit, it must be made out of the consumers of gas. The profit would be applied by the Corporation to the alleviation of the rates of the town; and, by doing this, the consumers of gas would be unfairly taxed for the benefit of the whole of the ratepayers. The fact was the Corporation ought to have bought the concern twenty years ago. Taking over the works meant taking upon themselves great responsibilities; and he did not believe any of the councillors would be prepared to do that. He was firmly convinced that their works were the best in the West of England for their size, and that before long the shares would be worth £3 each. In reply to a question as to the electric light, Mr. Tweedy remarked that if the Corporation decided to introduce it into the town, he did not hesitate to say that the Gas Company could supply it much cheaper than the town, and would be prepared to enter into a contract to undertake it.

The Baku Petroleum "Ring."—It is announced from Baku that the agreement between the members of the Naphtha Producers' Union, which expires next month, will not be renewed.

New Joint-Stock Companies.—The Edezell Gaslight Company Limited, has been registered with a capital of £1000 divided into 1000 shares of £1 each, to carry on the business of producers or manufacturers of gas or electricity for purposes of lighting, heating, or motive power. With the object of acquiring the Stansted Montfitchet Water-Works, and to develop them, the Stansted Water Company, Limited, has been formed, with a capital of £2000 in £1 shares. Under the title of the Manchester Tube Syndicate, Limited, a Company has been started, with a capital of £120,000 in £1 shares, to carry on and develop the business of the Manchester Steel Nut and Tube Company at Openshaw.

OIL AS THE STREET ILLUMINANT OF THE FUTURE.

The "Pall Mall Gazette" has discovered that "as a street illuminant oil would appear to have a great future;" but—mark this!—"everything depends on the temper of gas companies, some of which seem bent upon rushing to their destruction in the mad pursuit of big dividends." The writer of these words in our contemporary was led to pen them by the fact that one public body—the Horsham District Council—is (to use his bellicose language) already up in arms and eager for the fray, and has declared war against gas as a luxury wholly beyond the means of ratepayers of the district. The feeling in favour of oil among the members of the Council, we are told, now verges on the enthusiastic, and a statement that the town would save £200 a year by adopting oil, has virtually determined the matter. Perhaps the writer of the paragraph in the "Pall Mall Gazette" has never heard of local authorities who were at one time equally as enthusiastic as he supposes the Horsham Council to be, but whose warmth of affection for the inconvenient illuminant has cooled down considerably after a short experience. Strangely, on the same day that our contemporary published its effusion on the subject, news came to hand that the Settle Parish Council have decided to return from oil to gas. Last winter the streets were lighted by oil-lamps; but, in view of the approaching winter, the Lighting Committee of the Council opened negotiations with the Gas Company with the object of coming to terms for the restoration of gas lighting in the streets. The following day we also learned that the truth of the matter in connection with Horsham was this: That, at the last meeting of the District Council, one of the members proposed that the lamps in West Street should be fitted up for oil in lieu of gas; but an amendment was carried delaying the matter until the incandescent gas-lamps in North Street had received a trial. Before returning to the subject, the "Pall Mall" should seek a little information from the Settle Council as to why they have ousted the oil-lamps; and at the same time the inhabitants of Winchester might be asked whether they would care to banish their new incandescent gas-lights in favour of the displaced oil-lamps.

ELECTRIC LIGHTING NOTES.

The Local Government Board have approved of the acquisition by the Southampton Corporation of the local electric lighting works, and have sanctioned the borrowing of £54,000 for the purpose.

The Croydon Corporation yesterday week brought the new electric lighting works into use for the first time; the Municipal buildings, with the handsome clock tower, being illuminated. The Town Hall contains 1000 lights of 16-candle power each.

The Northwich District Council have entered into an agreement with the newly-formed local Electric Supply Company, who have applied to the Board of Trade for power to supply electric light in the rural and urban districts. The principal clause in the agreement gives the Council the option of purchasing the concern at the end of fourteen years on repayment of the expenditure incurred in buildings and plant, and the payment of 7½ per cent. for any year when a less dividend has been declared.

The application of the Colchester Town Council to the Local Government Board for sanction to borrow £15,000 for electric lighting purposes was the subject of an inquiry by Colonel J. O. Hasted last Friday week. The Provisional Order empowering the Corporation to supply electricity was obtained in 1893; and since then the question has constantly been under discussion. The Electrical Engineer consulted by the Corporation is Mr. W. H. Massey; and he informed the Inspector that it was proposed to employ the low-tension three-wire system, with storage batteries. There would be three 180-horse power steam-engines coupled direct to the dynamos, which would be capable of supplying current to about 4000 lights; but the buildings provided would be capable of a large extension of plant. The mains, too, were of sufficient size for conveying more current than it was at present proposed to distribute; and the feeders were laid down on such a system that gas explosions would be impossible. They were providing mains for 4360 yards of streets. The order for carrying out the work had been placed provisionally in the hands of the Electric Construction Company. The Council, he also mentioned, had decided to defer lighting the streets by electricity for the present. The Mayor (Alderman Wicks) said he favoured the application. There was a large military establishment in the district; and the buildings were recently extended. The military authorities demanded the electric light; and there was a considerable claim on the Corporation, as representing the general interests of the town, that this should be acceded to. The Inspector intimated that the sum of £100 for temporary plant for lighting the Military Hospital, which had been included in the application, could not form part of the loan. There was considerable opposition to the scheme, on the ground that the rates were already high; and as there was no prospect of making the concern a financial success for the first two years, the undertaking would be a burden on the rates.

At a meeting of the Bury St. Edmund's Town Council on Tuesday, Alderman Lake re-introduced the question as to the legality of a private Company formed with the object of indemnifying the Corporation for a period of 20 years against loss from supplying the borough with electric light—the Company to receive all the profits during that period. The proposal has already been noticed in the "JOURNAL." The Town Clerk now reported that the proposal was of such a novel character that he had thought it best to consult Mr. E. E. Baker, the Parliamentary Agent of the Corporation, who replied: "I certainly never heard of such a proposal before as that suggested in your letter, and very much doubt whether the Local Government Board would sanction it. But as the Corporation are applying for an Electric Lighting Order, the Board of Trade might be asked to insert clauses to carry out the proposal; and if they agreed probably the Local Government Board would also agree. The scheme would be quite unworkable unless the Corporation have an absolutely free hand with regard to the working of the undertaking, and as to the price to be charged." The matter was not discussed.

SANITARIANS AND WATER SUPPLY QUESTIONS.

The recent congress of the Sanitary Institute at Newcastle was productive of several useful papers, but few having any direct interest for our readers. Below we give an outline of the contents of two dealing with questions of water supply; and an epitome of others on cognate subjects will appear in subsequent issues.

The Inspection of Water Supplies by Local Authorities.

Dr. C. PORTER, the Medical Officer of Health for Stockport, read a paper, entitled "The Control and Supervision of Public Water Supplies by Sanitary Authorities." He said a review of the principal statutory water powers and duties of sanitary authorities showed that, outside the Metropolis, they are virtually without any powers of compulsory supervision, except in regard to wells or pumps. In the Metropolis, under the Water Acts of 1852 and 1871, the Board of Trade could invest inspectors with compulsory powers of entry and of compelling information in regard to any unsatisfactory supply; and the office of water examiner was created—the powers and duty of this official being to periodically visit the filters, &c., of the Companies, to see that their supply was efficiently filtered. Such "efficient filtration" merely meant that the water should be "clear, bright, and free from suspended matter"—crude and primitive requirements fully met by many very inferior sewage effluents. The Water Examiner's work was supplemented by chemical and bacterial examinations of the raw river water, of the filtered effluent, and of water from the service-pipes, by Dr. Edward Frankland, for the Companies and the Local Government Board. The recent Royal Commission on the Metropolitan Water Supply strongly urged the appointment of an examiner with the fullest powers of compulsory entry and investigation, to supervise and report upon the purification processes. If, said the author, this admirable recommendation be necessary for London, how much more so was it called for in communities at the mercy of private water companies? Adequate powers of inspection of all foods, and especially milk, already existed. In the course of the discussion on the paper, Sir Douglas Galton said he was not quite so strongly in favour of much additional power, because he thought that medical officers surely had the power at present to ascertain whether water was good and pure. There was no doubt it would be of very great importance to give to the authorities outside London some similar power to that which existed in London—of appointing a water examiner or analyst in each county, and then for the medical officer of health for the county, town, or district to be able to put in force those powers which the Water Examiner in London could do. He would not, however, at all advocate placing these powers under the Local Government Board or Board of Trade, because he thought the more they could get the local authorities to take an interest in questions of sanitation, the more power would be acquired by the medical officers; and the more power given to medical officers, the more power would be exerted by the local authorities. Dr. Squance (Sunderland) had no doubt that it would be infinitely preferable to have water supplies controlled by the sanitary authorities; but there was the great difficulty in this matter of educating the local authorities up to that belief. On the motion of Dr. Porter, seconded by Dr. Willoughby, a resolution was passed to the effect that any authorized official of a sanitary authority should be allowed at any time by day or night to inspect the water supply, and especially the places used for filtration and purification.

Water Suppliers and the Capacity of Flushing-Cisterns.

The second paper to be noticed to-day was by Mr. A. B. PLUMMER, F.R.I.B.A., the Hon. Secretary of the Northern Architectural Association. In it he recounted some experiments, conducted, in conjunction with Mr. Askwith, of the Newcastle and Gateshead Water Company, mainly with the view of ascertaining whether a 2-gallon flush was adequate for water-closets. In one set of tests, two lengths of drains were laid, each about 83 feet long. One length was formed of 6-inch pipes, with a fall of 1 in 40, and having a Buchan trap at 19 feet from where the drain gradient commenced, and with an obtuse bend at 12 feet from the discharge mouth of the drain. The second length was formed of 4-inch glass lined pipes, with a fall of 1 in 60, and having a Buchan trap at 6 feet from the start of the drain gradient, with a right-angle bend at about 12 feet from the discharge mouth of the drain. Various water-closet appliances were fitted in connection with these two lengths of drain, and were placed at heights representing the ground and first floor levels of a dwelling-house. The 6-inch drain was first tested, with a ground-floor Shank's 2-gallon flush syphon cistern, with a 1¼-inch flush-pipe. The distance from the water-line in the cistern to the top of the wash-down basin was 3 ft. 8 in.; and from the top of the basin to the bottom of the pipe where the drain gradient commenced was 3 ft. 8 in. A mixture of soft soap and sawdust weighing 10¼ oz., and without paper, was placed in the basin. The first flush cleared the basin. But it was not till the sixth flush that half the charge came out at the mouth of the drain; and at the eighth flush the remainder was discharged. Eight other similar courses of tests were carried out with various flushes, &c.; and it was noticed that though the 4-inch drain was not of so steep a gradient as the 6-inch pipe, and though it also had a much more acute bend in it, the result of these experiments was decidedly in favour of the smaller drain pipes. The author thought it might be taken for granted that no water company would desire to supply less water for flushing purposes than such an amount as might be the minimum quantity necessary. It would, he argued, be "penny wise and pound foolish" to supply too small a flush, as, in such a case, two or more flushes would be found to be necessary, and would undoubtedly be used by consumers instead of one of adequate amount. Now that pedestal closets were being universally introduced, and were used at all times and for all sorts of household purposes, the much greater amount of water wasted and used than was formerly the case, became, he said, a matter of serious consideration for water companies. He was clearly of opinion that all syphon cisterns were a mistake so far as water companies were concerned; and they were not necessary from other points of view. Of course, in the case of syphon cisterns, the full amount of the flush—say 2 gallons—was obliged to be used upon every occasion; whereas with other cisterns, only half a gallon could be used if desired, and, in many

instances, might be all that was necessary. The author went on to show that drains of large diameter from water-closets were unnecessary and the drains of as small a diameter as was essential for the purpose were more easily flushed and kept clean. Reference was then made to the inquiry into the 2 and 3 gallon flushing question in London; and this led the author to express the opinion that 2 gallons were sufficient for satisfactory sanitary apparatus, but not enough for flushing large drain pipes laid to a gradient of from 1 in 40 to 1 in 80. Further tests made subsequently to those alluded to above were next commented upon; the results showing that, with 4 and 3 inch metal drain pipes, the 2-gallon flush was sufficient. It was also found that, in the case of a 6-inch pipe, a 2½-gallon flush worked satisfactorily. Before concluding the author suggested that it would perhaps be possible to meet the requirements of water companies and the present demands of local authorities by having large drains of V or egg-shaped section; or preferably one with a large circular top and a restricted circular channel at bottom.

In connection with the congress, the usual health exhibition is being held in Olympia, Northumberland Road. Among the exhibitors, the Newcastle Water Company make a good show; and their appliances should do much in the way of educating the consumers as to the proper methods of fitting up their dwellings. The local agents of the Incandescent Light Company have also an effective display; and the system is employed to light the grounds attached to the building. There are twelve wind and storm proof lanterns, fitted with two Welsbach burners each. The lanterns give a light equal to 120 candles, with a consumption of 7 cubic feet of gas per hour. Thus the whole of the grounds are brilliantly lighted for four hours each evening at the small cost of 8d., taking gas at 2s. per 1000 cubic feet; the total consumption being only 336 feet.

THE WATER SUPPLY OF LEICESTER.

Completion of New Reservoirs at Swithland.

An important event for Leicester was the opening on Thursday last of the new reservoir which has been constructed by the Corporation at Swithland. For some years past, as "JOURNAL" readers well know, the town has suffered periodically from a restricted water supply; and it is hoped that, as soon as the new reservoir is brought into full use, the ratepayers will find themselves at the end of their troubles in this respect for many years. The new undertaking is a large one; and its total cost will amount approximately to £332,000. It is now two years since the first sod was cut; and nearly the whole of the work is finished. The contract for the construction of the reservoir, except the metal work, was let to Messrs. J. Aird and Sons on April 16, 1894, for £133,511. The scheme is to provide 100,000 more people with water. The storage capacity of the reservoir is upwards of 500 million gallons; and the yield per day is 2 millions. The drainage area is 3500 acres; and it will also take the overflow from Bradgate reservoir. The reservoir covers 220 acres of land; but altogether the Corporation have bought rather more than 275 acres to provide accommodation for the filter-beds, pumping-stations, &c.

In the preparation of the site, it may be mentioned as a matter of interest that the work included the removal of about 7000 tree stumps, nearly nine miles of hedgerows, and the leaf mould from about 28 acres of ground where the woods have been cut down. The drainage of the village of Swithland has also had to be dealt with, and the public road from Kinchley Hill diverted. The main trench of the embankment has been carried to a depth of over 50 feet below the surface; and the embankment reaches a maximum height of 35 feet above the surface. It contains upwards of 141,000 cubic yards of material, including the puddle wall in the centre. Embraced in the contract were the formation of a tunnel outlet, and valve-house and tower. The tunnel outlet is in the solid ground under the embankment, and has a length of 50 yards, is 9 ft. 6 in. in diameter inside, and is constructed with brickwork and concrete, with a layer of asphalte. It contains two cast-iron pipes—one 30 inches in diameter, to be used for any emergency, and for emptying the reservoir for the cleaning-out process; and the other 21 inches in diameter, for supplying the filter-beds. Inside the valve-tower there are 30-inch valves for opening and closing the large pipe, and two valves of 21 inches at different levels for decanting the water in the reservoir in its best state for use on the filter-beds. Outside the tower duplicated sluice-valves are provided, so as to close any or all of the inlets in case of accident to any of the valves or pipes inside the tower. The main weir, bye-wash, and bye-wash bridge are all of very large size, as they provide for the ultimate floods from the Bradgate drainage area, as well as for the new Swithland area—a total of nearly 8000 acres, and they are of ample size to allow of from ⅓ to ½ inch of rainfall to flow from the whole area per hour. The length of the bye-wash weir is 330 feet; and it is capable of safely passing a flood of 70 million gallons per hour. There are filter-beds having a total area of 75,000 square feet; and these are arranged around a hexagonal clear water tank. The capacity of this tank (which is covered) is about 400,000 gallons. A settling tank and pond are provided for receiving the water from the sand-washing apparatus, and a cooling pond has also been formed for the condensing of the water for the pumping-engines; it being considered advisable to adopt this method rather than that of pumping the filtered water through surface condensers in order to keep the water delivered to the town as cool as possible. An engine-house has been built to provide for three triple expansion pumping-engines, two only of which are now erected. These are of such capacity that they will be capable of raising 800,000 gallons in twelve hours to the height required for the high-level service; and the tender of Messrs. Easton, Anderson, and Goolden for them was accepted—the price being £8772. The boiler-house has been designed to accommodate four Lancashire boilers; and attached to it is a building for coal-stores, general stores, workshops, and economizers. The pipes, valves, girders, fencing, and other ironwork have been supplied by Messrs. J. Blakeborough and Sons, of Brighouse, Yorkshire, whose contracts amounted to £9627. The sand-washers, which are of special design, were supplied by Messrs. Shouler, Fraser, and Goodman, of Bow.

The scheme further includes a high-level service reservoir at Hallgates. Messrs. Aird undertook its construction, at the price of £14,774; its capacity being 2 million gallons. The extension of the filtering-beds at Cropstone likewise comes within the scheme. There are four new beds, each containing 728 square yards; and in the centre of each is an octagon pure water covered tank, 59 feet across. This work has been executed by Messrs. S. & E. Bentley, of Leicester, for a sum of about £15,000. The pipe laying is being carried out by Corporation workmen; the total amount that will be spent on mains being something like £30,000. The filtering extensions at Cropstone and the laying of the mains are works that have been entrusted to the superintendence of the Borough Water Engineer (Mr. F. Griffith, M.Inst.C.E.); while the remainder of the undertaking has been carried out from the designs, and under the superintendence, of Mr. J. B. Everard, M.Inst.C.E.

It may be noted that the combined drainage area of Thornton, Bradgate, and Swithland is 10,760 acres; and that the three reservoirs have a total capacity of 1419 million gallons—giving a yield per day of 6 millions, or equal to a population of 300,000, at 20 gallons per head. The present water population is 215,000.

The duty of formally opening the works last Thursday, was undertaken by the Mayoress (Mrs. Edward Wood), who was presented by Mr. Everard with a massive silver key of the engine-house. The Mayor afterwards entertained a large number of guests at luncheon.

SHEFFIELD CORPORATION WATER UNDERTAKING.

The New Scheme—Proposed Re-organization of the Staff—Mr. Eaton's Position.

At the Meeting of the Sheffield Town Council last Wednesday, an important report was submitted by the Water Committee in regard to the extensive works which are about to be carried out in connection with the joint water scheme of Sheffield, Rotherham, and Doncaster, and as to a proposed re-organization of the staff. The Committee stated that it appeared necessary to proceed as early as possible with the construction of the works. The section to be first gone on with would be the railway from Stocksbridge to Langsett, the Langsett reservoir and accessory works, and the pipe-lines from Langsett to Rotherham and Thrybergh. In reference to the engineering of the works, their Chief Engineer (Mr. E. M. Eaton) had informed a Sub-Committee that the time had arrived when he desired to commence practice at Westminster as a Civil and Hydraulic Engineer; and he suggested that, subject to the approval of the Water Committee, he should relinquish the post of Engineer at Sheffield, now held by him, and discharge the duties of Consulting Engineer on all matters connected with the existing water-works, and the distribution of the water, including also the completion of the Damflask reservoir. The Committee, after due consideration, now suggested that he should resign his present office, and be appointed, under certain specified conditions, Engineer-in-Chief for the construction of the works; receiving for his services a commission at the rate of 4 per cent. on the engineering cost of the works, exclusive of land and easements. Further, that he should also be appointed Consulting Engineer for the existing works, and for distribution, and also for the completion of the works at the Damflask reservoir, at a salary of £250 per annum, including all expenses. The commission and salary, it was stated, would cover the attendance of Mr. Eaton at Sheffield on an average of from one to two days a week. The Committee also recommended that Mr. William Terrey, the Manager of the department, be appointed General Manager, at a salary of £800 per annum, and that Mr. L. S. Marsh, the Resident Engineer, be appointed Engineer to the department, at a salary of £600 per annum. This re-organization would result in a net saving of £600 per annum. Mr. Eaton's present salary is £1200 a year; and the suggested retainer of £250, with the increase of £200 and £150 to Mr. Terrey and Mr. Marsh respectively, would only require half that sum.

The Council spent a considerable time in the discussion of the report. It was opened by Alderman Gainsford moving its adoption. He stated that he knew, as a matter of fact, that for some years Mr. Eaton had had a laudable and praiseworthy desire to establish himself as a civil engineer at Westminster. Recently he had had offered to him, apart from the Little Don scheme, a number of higher appointments and retainers such as would have enabled him to make a good start at Westminster. The works which the Committee were about to undertake were of considerable magnitude; and unless they were constructed with the utmost amount of skill and care, they might involve to the valley of the Don and to Sheffield a risk which it was impossible to over-estimate. An amendment was moved by Mr. H. Fisher, that the proceedings relating to Mr. Eaton and his retainer as Consulting Engineer, and the consequent re-arrangement of the staff, be referred back for further consideration. He pointed out that a salary at the rate of £250 a year for one and a half days a week was equal to £1000 a year for full time. Then as to the commission, if the Committee preferred this method of payment, they wanted a man of acknowledged reputation in the world of water engineers as their consulting engineer. He ventured to say that at the present time, Mr. Eaton was not such an expert; he had not had any practice yet. He (Mr. Fisher) had it on the best authority that the outlay on the Little Don scheme would "tot up" to something like £600,000; and 4 per cent. on this amounted to £24,000. Presuming the work took eight years, the 4 per cent. commission would mean that they would have to pay their non-resident Consulting Engineer £3000 a year. He proceeded to comment upon work on which Mr. Eaton had been engaged in connection with the Sheffield Water-Works, and its cost; and he subsequently said he hoped the members would not be led away with the idea that Mr. Eaton was the only possible man for engineering the new scheme. The amendment was seconded by Mr. Hobson. Mr. Roberts charged Mr. Fisher with having some feeling against Mr. Eaton, and pointed out that the Directors of the late Water Company held the highest opinion of their Engineer's abilities, besides which Mr. Thomas Hawksley had told him (Mr. Roberts) that Mr. Eaton stood in the foremost rank of hydraulic engineers in this country. Mr. Carr having expressed his confidence in Mr. Eaton's abilities,

Alderman Carter remarked that Mr. Eaton had resolved to commence practice in London; and the question was whether it would not be better to employ him than some other engineer, who would also only devote part of his time to the work. Alderman Gainsford intimated that £400,000 was the probable amount upon which commission would have to be paid. Alderman Brittain, while willing to accept the Committee's recommendations as to the competency of Mr. Eaton, was determined to give no vote except to a man who was willing to devote the whole of his time to the work. In the end, the Water Committee were requested to give the report further consideration.

SHEFFIELD CORPORATION WATER SUPPLY.

The Progress of the Undertaking—The Contest for the Little Don Watershed.

In the "JOURNAL" for Aug. 18, brief allusion was made to the address delivered by the Chairman of the Water Committee of the Sheffield Corporation (Alderman Gainsford) at the meeting of the Town Council on the 12th ult., in which he gave a sketch of the progress of the water undertaking since it has been in the hands of the municipal authority, and considered its prospects in view of the further powers obtained under the Sheffield Water Act of the past session. The address, which we reproduce, contained several matters of interest.

Alderman GAINSFORD, after a few introductory remarks, said the Corporation entered into possession of the water undertaking on Jan. 2, 1888. The terms which they gave for it were undoubtedly liberal, and they included the payment by the Corporation of a sum of about £50,000 which they did not know of when the negotiations were on foot, but which, according to the terms of the purchase, had to be paid. Since that time, the Corporation had been in possession of the undertaking for eight years, and they were therefore in a position to make some reasonable review of the situation in which they stood. In the first place, he must mention that the Corporation inherited a concern which was not looked upon with the very greatest amount of favour by the inhabitants of the town. But they endeavoured from the first to pay such care and attention constantly to every point of their duty, that the unfavourable impression which they inherited might be removed; and he hoped that as they stood now, after eight years of attention to the concern, they had removed that impression, and that there was no feeling but of satisfaction on the part of the inhabitants of the city towards the Water Department of the Corporation. In the next place, he thought it was right that people should remember, in looking over the position of the property, that the first function of such a concern, in a large town like Sheffield, was not to make money. He did not think an undertaking of this kind was at all comparable to a gas-works or a tramway, out of which it was legitimate to make a profit. It was not to the interest of the city or the people that the Water Committee should endeavour to make a profit out of such a commodity—such a necessity—as water. What they had aimed at, and what they proposed to continue aiming at, with regard to the water supply of Sheffield, was to give a full and constant service on the lowest possible terms as regarded price, and not to make it a concern of profit. Barring accidents in particular places, the continuous supply of water had never ceased for one moment since the year 1870—that was to say, for 26 or 27 years. Let this state of things be compared with the condition, for instance, of Manchester, Liverpool, and other great towns in 1893 and 1887, or with the position of Leicester or of East London at present, and he thought it would be admitted that Sheffield had considerable cause for satisfaction.

He would now turn to the position of the undertaking financially considered. The first thing he would note was that the cost of the administration of the undertaking, which in the last seven years of the Company's management stood at the rate of 1·98d. per 1000 gallons, or 21 per cent. of the revenue, had been reduced during the seven or eight years that the Water Committee had had the administration to only 1·77d. per 1000 gallons, or 18·97 per cent. of the revenue. Then he found that, comparing last year and the seven preceding years with 1887 (the last year of the Company's administration), the gross income of the undertaking had increased by £4000 in the first year of Corporation control, by £8000 in the second, by £11,000 in the third, and by £13,000, £16,000, £17,000, £20,000, and £23,900 in subsequent years. There had, therefore, been a constant and large increase year by year. During the eight years they had accumulated a total gross increase of revenue of £115,000; but the net accumulated increase was £150,000—that was, they had not only obtained that increase of gross revenue, but by reducing the charges on borrowed money, and also by a very small increase indeed in the cost of the administration, they had managed to make a net increase of £150,000, whereas the gross receipts of the concern had only increased £115,000. In other words, the gross receipts had increased 28·7 per cent., but the net receipts by 32·8 per cent.; and the actual cost of administration, which had been under their own control, had only augmented by 1·4 per cent. It was true there had been a large amount of extra rates and taxes to pay—an increase, in fact, of 25 per cent.; but this, of course, had been beyond their own control. Of the £150,000 total accumulated increase of profits during the eight years, they had dispensed £41,800 in increased revenue to the shareholders; and they had paid £5700 for salaries out of revenue account, which used to be put by the Company to capital account. In increased charges for capital, they had paid £18,590 and £29,800; and the effects of the frost last year had cost £10,600. Besides all this, they had put by towards the purchase of the freehold of the concern the sum of £43,600. His only comment on these figures was in reference to the expenditure of £10,621 out of revenue to cover the effects of the frost in the winter of 1894-5. It must not be supposed that all this was loss. The money was spent for the most part on the restoration and renewal of mains in bad condition, which sooner or later—and probably sooner rather than later—would have had to be replaced out of revenue. So that in any case the charge would have come upon them before many years. This was all he proposed to say with regard to the position of the undertaking up to the present time; but he must speak as to the ability of the concern to meet the proposal that the Committee should take off the first half of the old 25 per cent. increase of charges at the end of 1897. It would be in the knowledge of most members of the Council that this 25 per cent. had long been a very sore point. It always rankled very much in the minds of the public during the life of the Company; and it had remained in their minds since the Corporation took over the concern. Consequently, it would be a very pleasant thing for the public to know that the Committee proposed to take one-half of the 25 per cent. off their charges to consumers. The increase arose in this way: In 1864, after the bursting of the Dale Dyke reservoir, Parliament imposed 25 per cent. increased charges for 25 years. When the Corporation purchased the undertaking in 1887, the House of Lords added five years to the 25 years; and then, by the Corporation Act of 1893, they obtained power to add either two or three years more—making a total of 32 or 33 years, during which the whole of that 25 per cent. increase had to be kept up. It had been the Committee's intention to remove the first half of that percentage at the end of 1893; but the expenditure during the frost made it advisable to put the remission off until Dec. 31, 1897, which was the date now fixed. The reduction would take £10,433 annually off the revenue after Jan. 1, 1898; and it would be noticed that this amount compared almost exactly with the £10,621 which they had to spend as the effect of the frost last year. For the future, the calculations of the revenue and expenditure which had been made showed that the Committee could well afford to take off that first half of the 25 per cent.; and they also showed that at the end of eight years more they would be able to remit the other half, and still have a sufficiently large margin in hand to meet all contingencies in connection with the concern. He hoped it would be considered a pleasant and welcome message that the Committee now saw their way quite clear to making an end of the whole of that 25 per cent.—the first half at the end of next year, and the remaining half, according to the Act of Parliament, at the end of eight years after that, at the close of which period the increase in the charges would be swept entirely away, just as the Corporation promised when they applied to Parliament in 1887. This was as far as he proposed to go in regard to the prospects of the concern, unless, indeed, questions were put.

He wished now to make special reference to the effect which the recently-obtained Act of Parliament would have upon the concern. The calculations to which he had alluded had been made without particular regard to the effect of the Act; but he did not think he need give further figures, since the works which they would construct under that measure would at any rate not prejudicially affect the calculations—in fact, they might affect the finances beneficially rather than the reverse. As to the recent Act, and particularly as to the action of other Corporations during the last two years with regard to the Little Don Valley, he wished to fill up a gap which he left in the speech he made two or three months ago. When the Corporations of Barnsley and Dewsbury applied for an Act of Parliament to enable them to take water from the Little Don Valley, at the beginning of the session of 1895, he had to make some remarks at the public meeting in reference to the action of those Corporations; and he said at that time that he very much deprecated quarrelling and fighting between various Corporations, and that, at any rate, he could prophesy one thing if such quarrelling did take place, and that was that somebody—he did not say who, though he had a shrewd idea—would have to pay a very large amount of costs, and that the charge for the water would be considerably enhanced to somebody. He also stated at that time that he invited not Dewsbury—for they did not consider that Dewsbury had a fair claim to anything—but Barnsley, to enter into negotiations with the Sheffield Corporation; and he assured Barnsley that Sheffield would do everything that was just and right as between two towns so near together. What he said at the public meeting was emphasized by private communications which passed between the Chairman of the Water Committee of Barnsley and himself; and in every way that either the Committee or himself could turn, they endeavoured to prevent the waste of money and the contest which had taken place in Parliament. In reality, Sheffield had never assumed the position of denying to Barnsley some reasonable supply from the Little Don Valley. Of course, they could not go and blurt it out to the public that they were prepared to give Barnsley a quantity of water; but in the private negotiations which took place it was made perfectly clear to that Corporation, from the very first, that in the Sheffield Bill Barnsley could be assured of a supply of water without any cost or trouble at all, if only they would negotiate for it in a friendly and reasonable manner with the Corporation of Sheffield. What had resulted? In the first place, each Corporation had spent a very large amount of money in costs. As far as he could make out, some said the Corporation of Barnsley had spent nearly £20,000. He did not put it as high as that himself. Barnsley published a statement that up to the present there was a known expenditure of £13,500, but that this would not be the total. They had spent more than that; and it might very reasonably be taken that their expenses would amount to £15,000 for the two sessions. As for Sheffield, their bill of costs would probably amount to between £11,000 and £12,000; and let the Council mark the difference in the effect of the charges on the two Corporations. Both of these sums would have to be repaid, if borrowed, within ten years. To the Corporation of Barnsley, a loan of £15,000, obtained on even the most favourable terms, would, if repaid within ten years, involve at the very least a rate of 4·89d. in the pound. This was the Barnsley charge for costs alone. But the sum which Sheffield had spent, although a large amount—a serious amount—if repaid by instalments spread over ten years, would only mean a rate of 0·27d., or a little over ¼d. in the pound. Thus it would be seen that the incidence of the costs which were the result of the two years' conflict would be very different in the two towns. Barnsley, in fact, would be taxed 18 times as much as Sheffield.

It might be said that to touch only the question of costs was not to go to the root of the matter. That was quite true. They must consider also the cost of the water. The result of the conflict in that respect was this—that under the Sheffield Bill, if the four Corporations of Sheffield, Barnsley, Rotherham, and Doncaster had gone together in a joint partnership, the cost of the water would have been 4·36d. per 1000 gallons for the first 18 or 20 years, while the reservoirs were gradually

being brought into use; and ultimately it would have been reduced to only 3·84d. per 1000 gallons. But the result of dividing the works as they had been divided by the two Acts of Parliament, and the insistence of the Corporation of Barnsley on having their own works, was that Barnsley would have to pay for their water during the first 18 or 20 years not 4·36d., but 6·09d. per 1000 gallons—and afterwards they would have to pay 3·82d. per 1000 gallons—just the same figure as they would have had to pay ultimately if they had not opposed. They would have to pay 1¾d. per 1000 gallons more than Sheffield for the first 18 or 20 years, and no less than Sheffield afterwards; for Sheffield, having the part of this scheme which was the least costly, would get its water ultimately at only 3·72d., instead of 3·84d. per 1000 gallons—that was to say, at a fraction less than if Barnsley had accepted their proposal.

In these contests in Parliament, the Sheffield Corporation had had three objects in view: First, to secure that the good, top, pure waters of the valley should not be wasted, but should be used for the best purposes; secondly, that as this troublesome, difficult matter had been on hand for more than twenty years, it should be finally settled by a complete disposal of the resources of the Little Don Valley; and, thirdly, that in any settlement which should be made Sheffield should come off financially no worse than if their own scheme were accepted as a whole. Three months ago he showed that two of these objects had been fully gained. The top water would be saved by going into Sheffield Langsett reservoir instead of into the Barnsley Midhope reservoir; they had obtained a scheme dealing with the whole resources of the valley, so that there was no possibility of the question remaining open any longer, or being re-opened in the future; and now the matter was complete, since he had shown that financially Sheffield would, if anything, gain slightly by the settlement, while the increased expense of the works was thrown entirely upon the Corporation of Barnsley. The position which the Sheffield Corporation had taken up was therefore, he submitted, entirely and satisfactorily justified by the result.

There was only one other point with which he would trouble the Council. He had not given these figures for the purpose of showing that Sheffield had made a good arrangement, and that Barnsley had made a bad one. It would be a fruitless task to say simply that. He did not say that Barnsley was not justified in trying to do what it thought was best; but he had made these remarks in order to show the result of the course of action which Barnsley had thought fit to pursue, and with this further object in view—that even now, if a different course of action should commend itself to Barnsley, there was a possibility of something in the direction of economy being carried out by them. For if these two Acts of Parliament which had been passed were both administered as they were proposed to be—that was to say, if the Corporations of Sheffield and Barnsley proceeded immediately to construct the Langsett and Midhope reservoirs respectively—great waste of money would ensue. These proposed reservoirs were within a mile of each other; and the Council would see that if Sheffield proceeded to spend £200,000 on the one, while at the same time Barnsley embarked on the expenditure of £140,000 on the other, there must be a waste of money, since for a number of years to come the Langsett reservoir would be able to supply the wants of both populations. Moreover, it would be a waste not so much of Sheffield money as of Barnsley money. The Sheffield expenditure of £200,000 must in any case become fully remunerative in eight or ten years from now, whereas the Barnsley outlay would not become remunerative for 18 or 20 years to come. The conclusion was obvious. If the Council thought well, and if the Corporation of Barnsley thought well, some friendly arrangement might be made by which the loss involved by spending both these sums at one and the same time would be avoided; and then only one of the two sums would be laid out immediately, the other being postponed for a few years until the second reservoir became absolutely necessary. He threw this out as a suggestion which possibly might reach the authorities at Barnsley; and he might say at the same time that the other day, in answering a letter of the Chairman of the Water Committee of Barnsley, originating out of something which he (Alderman Gainsford) had said, he assured the Barnsley people that they might take it that the Sheffield Corporation had nothing in their minds but considerations of business, together with the kindliest feelings towards their friends and colleagues in municipal work at Barnsley. It would be the reverse both of good feeling and policy, now that the contest was over, if they were not to sit down and do the very best they could for their respective constituents. This was the only feeling which ought to animate Barnsley or Sheffield; and he hoped it would be so. With regard to Rotherham and Doncaster, they, of course, had stood by Sheffield thoroughly, loyally, and well throughout the whole of these proceedings; and it was satisfactory to be able to say that these Corporations, having done so, would now share with Sheffield that better position and that cheaper water he had mentioned—cheaper than if they had each gone in for any separate Bill or scheme.

He could not close without saying that during these eight years, and throughout the difficulties which the Committee had had during the last two years, the greatest possible credit was due to the whole of the most excellent staff of the Water Department; and he used the word advisedly. He scarcely liked to particularize anyone on the staff, because all were so deserving, each of his proper measure of praise according to the position he held; but he could not help knowing that the satisfaction of the Committee mostly centred upon the Managers—Mr. Eaton and Mr. Terrey. As for the Committee, they had had the one only and sole desire in all this business to work for the welfare of Sheffield in this important matter of the city water supply. Sheffield was now prepared with water for 34 years to come; and as that period passed by with a plentiful supply of water, as this constant flow of water came down to a population of 400,000, increasing during that period to something like 600,000; as the cost of that water would be cheapened shortly by the remission of half the 25 per cent., and eight years later by the remission of the remaining half; and as by the end of that 34 years Sheffield would have bought out, by means of the sinking fund, actually half what the whole freehold cost—so he hoped that it would be satisfactory to the members of the Committee and to the Corporation to know that they had taken some little trouble in acquiring this great supply of water for the people of Sheffield.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Waverley Association of Gas Managers held their half-yearly meeting at Galashiels on Thursday. The proceedings (a report of which appears on another page), according to custom, were conversational, and of local more than general interest; but in adhering to this form of conducting their business, the members probably do greater service to themselves than if they followed more ambitious lines. There is one thing upon which the Association are to be congratulated, which is that they have in their membership nearly the whole of the gas managers in their district. This testifies to the fact that good is being done by the Association.

This week the annual Trades' Congress was held in Edinburgh. The gathering is almost entirely composed of secretaries of trades and labour organizations; and being such, it is the case, as might in the circumstances be expected, that the general average of intelligence, and of oratory, is much higher than it would be in a group of ordinary working men. Keeping that in mind, the foremost feeling which arises on viewing the meeting is that, whatever may be the public motive which gives rise to movements for the organization of trades and labour classes, those who head them are simply men who wish to better themselves individually. Without movements of the kind, the men who met in congress would be merely workers in obscurity, and would not be heard of. In this aspect, the desire for personal improvement is meritorious; but while this is so, it cannot be lost sight of that it is a feeling which is, to some extent, negative of the underlying principle of trades unionism, which is founded on the doctrine of equality. If, too, in idea the constitution of the Trades Union Congress be not quite logical, there is a greater departure in the practice of the congress from logical methods. A congress of trades unions, to be capable of filling its natural position, should be a gathering of delegates who would occupy part of their time in the consideration of existing difficulties, to the intent of strengthening the hands, financially and otherwise, of those who might be weak, or of supplying direction and guidance where those might be wrong. Such, in effect, would be a realization of that "solidarity of labour" which is so much talked of, and, to outside minds, would appear to be the means of making the congress much more of a power than it is. But there is, practically, no such step taken at the annual meetings—all movements of the kind are outside ones. Instead of so occupying their time, the congress men confine themselves to the passing of resolutions urging that certain things should be done; the doing of which they leave chiefly to a Parliamentary Committee, which Committee, in turn, seem to do as little as they can. Thus the same subjects come up year after year; and reforms, so far as the congress is concerned, get no further forward. Some resolutions were spoken to as having been before the congress for as many as 18 years. This may suit the book of some of them, who, if their reforms were to become fact, might lose their seats in the congress. Whether or not this be so, it is significant that those subjects—such as the nationalization of the land—which are more abstract, and less likely to be realized than many others, are the most popular. It is also a conspicuous feature of the congress that the representatives of well-consolidated and wealthy organizations, like the engineers and the weavers, are much more sober in their demands than are the loud-mouthed delegates of the more inconstant and difficult to keep together unions of dockers, gas workers, and labourers. The latter appear to require to work harder to maintain their organizations; and they are thus more in evidence in the discussions. Further, as they, of necessity, appeal to a less intelligent and more helpless stratum of the community than the delegates of the fixed trades, the reforms they seek are more drastic, and the language they use partakes much more of the revolutionary. Nothing less than Socialism is sufficient for them. In this congress, it was from the delegates of the gas workers' and general labourers that nearly all the Socialistic proposals received their chief support. Mr. Thorne and Mr. Curran were both prominent when Socialistic resolutions were under consideration. It was, too, the gas workers' delegates who showed most disappointment at the President closuring the discussion upon a "nationalization" proposal, just after the resolution had sustained a fierce onslaught from Mr. Fenwick, M.P. The resolution was adopted; but it is a much milder one than that which was carried by Mr. Keir Hardie in 1893. The whole proceedings were tamer than they have been for some years, which is due to the fact that Mr. Keir Hardie and others are now ineligible as members, on account of a change in the constitution of the congress. The congress not being congenial to some of the wilder spirits, a good deal of time was spent by them in organizing work outside, which, it is desired, shall have the effect of bringing in much-needed subscriptions.

A branch of the Gas Workers' and General Labourers' Union was opened in Edinburgh last night; but so far as I learn, it is more largely a labourers' than a gas workers' union. The gas workers in Edinburgh are too comfortable to have any desire to set up differences between themselves and their employers. In proposing the resolution demanding a legal eight-hour day in all trades and occupations, Mr. W. Thorne, of the Gas Workers' Union, said that in his own trade (?) within the last few years 2000 or 3000 men had been thrown out of work by the introduction of machinery. The congress adopted the resolution, and declined to adopt a proposal which would have allowed a 48-hour week. Mr. Thorne forgot to say in how many gas-works there is at present an eight-hour day, and also to what extent the disturbances among gas workers had led to the introduction of machinery. Taken all over, the congress is not a thing which need make even the most nervous afraid. As I have said above, there is more inclination to talk than to work; and the wildest talk is all on the least practical subjects.

It was my good fortune to be present in the Aberdeen Town Council this week when the annual accounts in the gas and electricity department, and the estimates for the current year, came up for consideration. Mr. Johnston, the Convener of the Works Committee, in submitting them, said that the principal item of income—the sale of gas—had yielded £68,712 during the year, or an increase on the former year of £3272, although the price charged was 1d. less per 1000 feet sold.

The increase in the consumption of gas was no less than 30 million cubic feet. Residual products, however, had realized less than in the previous year, although no less than 3000 tons of coal extra had been used. Tar was £1000 under last year; and coke, £400. This was a regrettable feature; but it was a matter that was wholly beyond the control of the Gas Committee. Turning to the expenditure side of the account, he pointed out that the manufacture of gas had cost £51,252—an increase over the amount for the previous year of £3618. This was owing to the larger quantity of coal required to produce the 30 million feet of gas extra, already referred to. The charges for distribution, feu duties, rents, taxes, and management had absorbed £9330—an increase of £342. Discounts to large consumers amounted to £2485—an increase of £200; and bad debts came to £224. There had been a profit upon stoves of £110. The depreciation written off for the year was £4764. The gas annuities required £4988; interest, £3042; sinking fund, £4929; and the usual £300 had been set aside to the reserve fund, which now amounted to £18,391. The result of the year's working had been a loss of £2698; and this amount had, of course, been taken out of the surplus of £6747 earned two years ago, leaving the surplus now at £3651, which had been carried forward to next year. The unaccounted-for gas stood at 8·18 per cent.; having fallen for the year by rather more than 0·5 per cent. The present book value of the undertaking stood at £153,956; but the gas-works were worth a much larger sum. A new valuation was in progress, and would be completed before the annual accounts were again presented; and the financial standing of the concern would then be better seen. With regard to the estimates for the ensuing year, he stated that every item set down had been carefully considered. Coal was again bought on favourable terms; and although in the past year a loss of £2698 was sustained, there was still a credit balance which would enable the Council to supply gas at the same figure as in the previous twelve months—viz., 3s. 4d. per 1000 feet. It was a pleasing testimony to the confidence which the Town Council repose in the Gas Committee and the Manager (Mr. Alex. Smith) that the accounts and estimates were adopted without further comment than a sentence of congratulation by the Lord Provost at the way in which the undertaking had been attended to during the past year. Mr. Smith is certainly to be congratulated upon the exceptionally strong position into which he has succeeded in bringing the undertaking. When present extensions are completed, he will possess works of a solidity and permanence which I know none to compare with; and with abundant reserve in manufacturing and storage plant, combined with an exceedingly low capital account due to so much having been written off—the account having been reduced from £289,956 to £153,956—he will have an opportunity of giving good results which few in the United Kingdom possess, and which many might well envy.

The annual meeting of the shareholders of the St. Andrew's Gas Company was held on Wednesday in the Company's office. Mr. J. Ritchie Welch, who presided, congratulated the shareholders on the continued prosperity of the Company, which was in a large measure due to the admirable manner in which its affairs were managed by Mr. Hall, who had just read his forty-seventh report, and who was now ably assisted by his son Mr. Robert Hall. During the past year they had manufactured 29,101,000 cubic feet of gas, which was 422,000 cubic feet less than last year. Their income was less than last year by £527. Of this sum, £318 represented the additional discount of 3d. per 1000 feet allowed to consumers who paid their accounts within one month. A considerable sum had been expended on the works. Two new ovens, with five retorts in each, with new fittings on the most modern principle, had been erected at a cost of £369; and a new steam boiler, engine, and set of new pumps had also been placed in the works, at a cost of £280. The report was adopted, and the usual dividend declared.

On Monday, the North Berwick Gas Commissioners considered the subject of the salary which they pay to their Manager (Mr. J. Black). Provost Whitecross said he thought it was their duty to make their Manager, who was doing his work to their satisfaction, as comfortable as possible; and he moved that they increase his salary to £120 a year, and instruct him not to let his house. The present salary is £80; and the Manager has been allowed to augment it by taking in summer visitors. It is, however, not in all cases desirable that, where a house is practically within the works, visitors should be taken in; and the Commissioners' proposal was a step in the right direction. The proposal of the Provost was agreed to by a majority.

The neighbouring town of Dunbar is less happily situated in the matter of its gas-works. The Corporation about six years ago acquired the undertaking; and they have never been able to conduct it with that success which all would wish to see—the chief reason for which, I am persuaded, has been their own divisions and the jealous disposition they have shown towards the three Managers they have successively had. There is now a proposal to sell the undertaking. An alternative proposal is that a rate-in-aid should be levied; but there is some doubt, after the decision in the Lockerbie case, as to the legality of this step. Nothing is to be done in the matter till after consultation with the ratepayers.

The Carnoustie Gaslight Company held their annual meeting last Wednesday week. A dividend at the rate of 7½ per cent. was declared; and a reduction of 5d. per 1000 cubic feet was made in the price of gas. Last year there was a similar concession.

There has been in this part of the United Kingdom during the past fortnight an abundance of rain, or, considering that the greater part of the grain crop is still unsecured, what many regard as a superabundance. While farmers are grieving over the partial destruction of one of the finest crops which have ever been grown, the rain has brought relief to the minds of many who have charge of water-works. Though there has been sufficient rain for agricultural purposes, there has not been enough to keep springs replenished, with the result that, in not a few cases, supplies are getting short. This is the case at Haddington, where the Police Commissioners a few years ago spent £7000 in bringing in a new water supply. This new supply was equal to 100 gallons per minute; but it has recently fallen to 56 gallons.

Gas-Works Extensions at Droitwich.—The Droitwich Corporation have decided to extend the gas-works, at an outlay of about £3000, in spite of protests by several of the members who thought the adoption of the electric light in the town, in the near future, probable.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST (see ante, p. 496).

Issue.	Share.	When ex Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	15 Apl.	10½	Alliance & Dublin 10 p. c.	25½–26½	..	3 19 3
100,000	10	,,	7½	Do. 7 p. c.	18–19	..	3 18 11
300,000	100	1 July	5	Australian (Sydney) 5% Deb.	108–110	..	4 10 11
200,000	10	12 June	5	Belgrano (B. Ayres), Limited	10¼–10⅜	+¼	4 13 1
100,000	Stck.	26 June	5	Do. 5 p. c. Deb. Stk	100–103	..	4 17 1
208,000	5	29 May	6½	Bombay, Limited	7⅞–8¼	..	3 18 9
40,000	5	,,	6½	Do. New, £4 paid	5½–6	..	4 6 8
380,000	Stck.	13 Aug.	12	Brentford Consolidated	285–290	..	4 2 9
210,000	,,	,,	9	Do. New	215–220	..	4 1 9
50,000	,,	,,	5	Do. 5 p. c. Pref.	140–145	..	3 9 0
159,375	,,	12 June	4	Do. 4 p. c. Deb. Stock.	130–134	..	2 19 9
220,000	Stck.	27 Mar.	11¼†	Brighton & Hove Original	247–252	..	4 11 3
208,820	,,	,,	8½†	Do. A Ord. Stk.	190–195	..	4 7 2
933,500	Stck.	28 Aug.	5	Bristol, 5 p.c. max.	127–132*	..	3 15 9
420,000	20	27 Mar.	11½	British	57½–58½	..	3 16 11
50,000	10	28 Aug.	11½	Bromley, Ordinary 10 p. c.	22–23*	..	5 0 0
71,000	10	,,	8½	Do. 7 p. c.	19–20*	..	4 5 0
500,000	10	29 Apl.	5	Buenos Ayres (New) Limited	10¾–11¼	..	4 8 11
200,000	100	1 July	6	Do. 6 p. c. Deb.	103–106	..	5 13 2
150,000	20	15 July	8½	Cagliari, Limited	29–31	..	5 6 5
130,000	10	29 May	8	Cape Town & District, Ltd.	16–17	..	4 14 1
50,000	50	2 May	6	Do. 6 p. c. 1st Mort.	58–60	..	5 0 0
550,000	Stck.	15 Apl.	13½	Commercial Old Stock	345–350	..	3 17 2
165,000	,,	,,	10⅞	Do. New do.	260–265	..	3 19 3
165,000	,,	12 June	4½	Do. 4½ p. c. Deb. do.	152–157	..	2 17 3
800,000	Stck.	12 June	13	Continental Union, Limited.	287–292	+2	4 9 0
200,000	,,	,,	10	Do. 7 p. c. Pref.	220–225	..	4 8 11
51,600	Stck.	28 Aug.	14	Croydon Com'cial A 10 p. c.	315–320*	..	4 7 6
163,400	,,	,,	11	Do. B 7 p. c.	250–255*	..	4 6 3
535,000	Stck.	28 Aug.	5¼	Crystal Palace Ord. 5 p.c. Stk	140–143*	..	3 13 5
60,000	,,	,,	5	Do. 5 p. c. Pref.	140–145*	..	3 9 0
486,090	10	15 July	11	European, Limited	26½–27½	..	4 0 0
354,060	10	,,	11	Do. £7 10s. paid	18–19	..	4 6 11
5,746,590	Stck.	13 Aug.	12½	Gaslight & Coke, A, Ordinary	313–318	−2	4 0 2
100,000	,,	,,	4	Do. B, 4 p. c. max.	110–115	..	3 9 7
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	305–315	..	3 3 6
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	147–152	..	3 5 9
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	212–217	..	3 9 1
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	207–212	..	3 6 0
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	305–315	..	3 3 6
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	173–178	..	3 7 5
1,061,150	,,	12 June	4	Do. 4 p. c. Deb. Stk.	138–143	..	2 15 11
294,850	,,	,,	4½	Do. 4½ p. c. do.	153–158	..	2 16 11
908,000	,,	,,	6	Do. 6 p. c. do.	207–212	..	2 16 7
70,000	10	14 May	6	Hongkong & China, Limited	12–13	..	4 12 4
3,820,000	Stck.	14 May	12	Imperial Continental	252–257	..	4 13 4
376,400	100	1 Aug.	4	Do. 4 p. c. Debs. Red.	100–103	..	3 17 8
473,600	Stck.	13 Aug.	3½	Do. 3½ p. c. Deb. Stk ,,	108–110	..	3 3 8
75,000	5	26 June	6	Malta & Mediterranean, Ltd.	6–6½	..	4 12 4
560,000	100	1 Apl.	5	Met. of Melbourne, 5p. c. Deb.	115–118	..	4 4 10
250,000	100	,,	4½	Do. 4½ p. c. Debs.	110–112	..	4 0 4
541,920	20	12 June	5	Monte Video, Limited	16½–17½	..	5 14 3
150,000	5	29 May	8	Oriental, Limited	8¼–8⅜	..	4 11 5
135,000	5	,,	8	Do. New, £4 10s. paid	7⅛–7¼	..	4 12 10
15,000	5	,,	8	Do. do. 1879, £1 paid	1⅞–2	..	4 0 0
60,000	5	12 Mar.	7	Ottoman, Limited	5–5½	..	6 7 3
420,000	100	1 May	6	People's Gas } 1st Mtg. Bds.	105–110	..	5 9 1
500,000	100	1 June	6	of Chicago } 2nd Do.	102–107	..	5 12 1
250,000	10	27 Mar.	8	San Paulo, Limited	13½–14½	..	5 10 4
5,475,000	Stck.	13 Aug.	5⅛	South Metrop., 4 p.c. Ord.	152–155	..	3 7 1
820,000	,,	15 July	5	Do. 5 p. c. Deb. Stk.	173–176	..	2 16 10
60,000	Stck.	12 Mar.	11½	Tottenham & Edmonton, A	265–275	..	4 3 7
60,300	,,	,,	8½	Do. B	185–195	..	4 7 2
170,380	10	29 May	10	Tuscan, Limited	13½–14½	..	6 18 0
149,900	10	1 July	5	Do. 5 p. c. Debs. Red.	100–102	..	4 18 0
				WATER COMPANIES.			
746,123	Stck.	26 June	10½	Chelsea, Ordinary	345–350	..	2 18 7
150,000	,,	,,	5	Do. 5 p. c. Pref.	177–182	..	2 14 11
160,000	,,	,,	4½	Do. 4½ p. c. Pref. Stk., 1875	160–164	..	2 14 10
175,785	,,	27 Mar.	4½	Do. 4½ p. c. Deb. Stock	165–170	..	2 12 11
1,719,514	Stck.	15 Apl.	7	East London, Ordinary	237–242	..	2 17 11
654,740	,,	26 June	4½	Do. 4½ p. c. Deb. Stk.	165–170	..	2 12 11
100,000	,,	,,	3	Do. 3 p. c. Deb. Stk.	105–107	..	2 16 1
700,000	50	12 June	7½	Grand Junction, 10 p.c. max.	123–127	..	2 19 0
280,000	Stck.	27 Mar.	4	Do. 4 p. c. Deb. Stk.	152–157	..	2 10 11
708,000	Stck.	13 Aug.	12	Kent	347–352	..	3 8 3
160,000	,,	,,	7	Do. New, 7 p. c. max.	220–225	..	3 2 3
1,043,800	100	26 June	7½	Lambeth, 10 p. c. max.	267–272	..	2 15 2
406,200	100	,,	7½	Do. 7½ p. c. max.	227–230	..	3 5 2
350,000	Stck.	27 Mar.	4	Do. 4 p. c. Deb. Stk.	152–157	..	2 10 11
500,000	100	13 Aug.	12⅕	New River, New Shares	433–438	..	2 18 11
1,000,000	Stck.	30 July	4	Do. 4 p. c. Deb. Stk.	157–160	..	2 10 0
902,300	Stck.	12 June	4	S'thwk & V'xhall, Ordinary	157–162	..	2 9 4
126,500	100	,,	4	Do. Do. 7½ p. c. Max.	150–155	..	2 11 7
489,200	Stck.	,,	5	Do. Do. 5 p. c. Pref.	175–180	..	2 15 6
1,019,585	,,	15 Apl.	4	Do. 4 p. c. A Deb. Stk.	153–156	..	2 11 3
1,155,066	Stck.	12 June	10	West Middlesex	328–333	..	3 0 0
200,000	,,	,,	4½	Do. 4½ p. c. Deb. Stk.	165–170	..	2 12 11

*Ex div.

† Next dividend will be at this rate.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Sept.* 12.

Sulphate of Ammonia.—All through the week the market has remained without animation; and there has been no new feature to comment upon. There has been a fair demand. But supplies have been ample; and prices have been barely maintained. The closing quotations are £7 10s. f.o.b. Leith, £7 11s. 3d. Hull, and £7 13s. 9d. to £7 15s. Liverpool. Speculators are acting with more caution in the forward position; and there would be rather buyers than sellers at the lowest prices recently accepted. Makers' quotations are still £8 to £8 2s. 6d. for delivery over the early months of next year.

Nitrate of Soda remains very quiet at 7s. 10½d. for ordinary, and 8s. for fine quality on spot. Due cargoes are worth about 7s. 9d.; and autumn shipments are quoted 8s. 3d. to 8s. 4½d., according to position, without finding buyers.

LONDON, *Sept.* 12.

Tar Products.—Benzols are nominal at about last week's figures, although no further important business has been noted. For this year's delivery, there seems but little available; hence the market for spot is much firmer than for forward. There is more inquiry for toluol, which is quoted a shade higher. Solvent naphtha has also improved; and several buyers are now looking out for next season's delivery. Carbolic is sluggish at 1s. 9d. to 1s. 10d.; and there seems no immediate reason to look for better prices—at all events, for the next month or two. There is nothing special to mention in anthracene, which keeps steady at recent prices. Creosote and oils are in fairly good demand, and at improving prices. Pitch buyers are offering lower rates for next season's deliveries; but sellers are not so keen to do business at the reduced prices offered.

Values are as follows: Tar, 19s. to 27s. 6d. Pitch, 31s. Benzols, 90's, prompt, 4s. 6d.; forward, 4s.; 50's, prompt, 3s. 4d.; forward, 3s. Toluol, 2s. 3d. Solvent naphtha, 1s. 6d. Crude, 30 per cent. naphtha, 1s. 4d.; forward, 1s. 3d. Creosote, 2d.; liquid, 2⅜d. Heavy oils, 45s. Naphthalene, pressed, 65s.; salts, 35s. Cresylic acid, 10d. Carbolic acid, 60's, 1s. 9d. to 1s. 10d. Anthracene, "A quality," 10½d.; "B," 8½d.

Sulphate of Ammonia remains flat, but is principally sold for prompt delivery; sellers seeing no advantage in accepting the current low rates for forward delivery. Prices range from £7 7s. 6d. to £7 12s. 6d., less 3½ per cent. discount.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—No appreciable improvement can as yet be reported in the coal trade of this district. As regards manufacturing classes of fuel, requirements for mill and works purposes have scarcely yet got back into the ordinary groove after the holiday stoppages. Very few pits throughout Lancashire are working more than four days per week; but prices, which have practically got to the lowest possible point, are generally maintained at late rates. Surplus supplies from other districts—particularly Notts. and Derbyshire—are, however, being pushed in this market at excessively low figures. Best Wigan Arley does not average more than 9s. 6d. to 10s. per ton at the pit; Pemberton four-feet and seconds Arley, 8s. to 8s. 6d. Of engine fuel, there are ample supplies, with low-priced surplus lots offering from outside districts; and buyers evidently expect that some concession will have to be made in prices for Lancashire slack. Local colliery owners, however, show no signs of any giving way on their quoted rates, which average about 4s. 3d. to 4s. 9d. per ton at the pit for best slack, and 3s. to 3s. 6d. for common sorts.

Northern Coal Trade.—Rather increased dulness has shown itself in the steam-coal branch of the coal trade; some of the orders to the northern ports having been worked off. The price quoted for best Northumbrian steam coal is maintained at 8s. 3d. per ton f.o.b.; second-class steam being about 7s. 9d. In regard to gas coals, there is a steady demand, which is enlarged weekly, both for local use and for shipment to the southern gas companies. The price quoted for best Durham gas coal varies generally from 6s. 6d. to 6s. 10½d. per ton f.o.b.; but there are one or two large producers who are well sold forward, and who ask as high as 7s. 3d. per ton for such coal as they have free to sell. Gas coke is now being more largely produced; but there seems an increased demand for it, both in the export branch of the trade and the less extensive local household demand. There is no alteration reported in the price this week.

Scotch Coal Trade.—There is a feeling of unrest at present, on account of the demand by the men for an increase of wages. The masters do not seem to be prepared to grant the increase; and the men are being advised by their leaders to take holidays, with a view to reducing stocks and raising prices. The markets remain as last week. The prices quoted are: Main, 6s. 3d. per ton f.o.b. Glasgow; and ell, 6s. 9d. to 7s. The shipments for the week amounted to 164,367 tons—a decrease on the preceding week of 961 tons, and on the corresponding period of last year of 787 tons. For the year to date, the total shipments have amounted to 5,195,682 tons—an increase over last year of 220,412 tons.

A Large Australian Water Scheme.—According to a telegram from Perth, Western Australia, received through Reuter's Agency, the Legislative Council have agreed to the third reading of a Bill authorizing the expenditure of £2,500,000 for providing the Coolgardie Goldfields with a water supply.

A New Gasholder for the Wath-on-Dearne Gas Company, Limited.—A 62 feet diameter telescopic holder has recently been completed for the Wath-on-Dearne Gas Company by Messrs. Clayton, Son, and Co., Limited, of Leeds, to the satisfaction of Mr. Matt. Dunn, the Engineer of the Selby District Council Gas Department, to whose hands the design and superintendence of the work was entrusted.

RICHMOND & CO., LTD.,

WARRINGTON & LONDON.

THE "ORIENT."

This is a charming hot-air, tubular Stove, and is made either condensing or non-condensing. In either case, it may be safely used without a flue (only fitted for flue when ordered).

No. 553, With Copper Pillars and Ruby Glass in body	..	Consumption. 16 ft. per hour.	.. 37/6
No. 1553, Ditto, and with Cathedral Glass Lighting Door and Side Pieces	..	Ditto	.. 42/-
No. 2553, Ditto, ditto, Condensing	..	6 ft. per hour.	.. 55/-

	Height.		Depth.		Width.
Sizes over all ..	32 in.	by	18 in.	by	21 in.

The Assessment of the Lambeth and Chelsea Water Companies' Reservoirs.—The East Molesey District Council have decided to stay proceedings in respect to the assessments of the reservoirs of the Lambeth and Chelsea Water Companies; and the Clerk has been instructed to take the necessary steps for having the November and May rates amended. The matter was before the Magistrates at the Surrey Quarter Sessions in July last (see *ante*, p. 84).

A Good Sign.—At the last meeting of the Brighton Water-Works Committee, it transpired that manufacturers of water-pipes are at present so busy all over the country that there has been considerable difficulty in getting tenders for the pipes required for connecting the Shoreham Water-Works with the Brighton Corporation mains. The Stanton Iron-Works Company put in a tender, which was accepted, but afterwards withdrawn; and, in the end, the order was given to Messrs. Cochrane and Co., of Dudley, to supply the 16-inch cast-iron pipes required for a sum of £8355, and the irregulars at £9 per ton.

Suffocated by Gas at Brighton.—Two young fishermen, named Alfred Hazelgrove and George Vergo, were suffocated by gas in one of the arches on the Lower Esplanade on Brighton Front last Thursday evening while asleep. A ganger, in the employ of the Gas Company, was searching for an escape in the road; and, detecting a smell arising from the arch, entered, and came across Hazelgrove, who was insensible. He at once obtained assistance, and then Vergo was found, also unconscious. Artificial respiration was immediately resorted to, but without avail; and the doctors who were called could only pronounce life extinct.

The Plymouth New Water-Works.—Satisfactory progress continues to be made with the construction of the new reservoir for the supply of Plymouth. The building of the masonry dams was commenced in November last, and is now proceeding at the rate of 700 cubic yards per week. Mr. E. Sandeman, the Corporation Water Engineer, recently stated that 5000 cubic yards of masonry concrete had been laid in the Sheepstor trench, and 8000 cubic yards in the Burrator trench. He anticipates that the construction of the main dam will be completed in twelve months, and that by the end of 1898 the reservoir will be filled.

Destruction of Oil-Gas Works by Fire.—The extensive oil-gas works belonging to the Dublin, Wicklow, and Wexford Railway Company, at Bray, were burned to the ground last Sunday. The works were used for the manufacture of train gas; all the trains on the system, as well as those working the City of Dublin Junction Railway, being supplied with gas from this establishment. The fire broke out shortly before nine o'clock; and four minutes after receiving the alarm, the local fire brigade was at work, but could do little beyond saving the adjoining premises. The timber work of the building, and the quantity of oil, tar, and escaping gas made a great conflagration. The connections to some large iron gas-tanks were melted; and it was found impossible to let the confined gas escape. For some time it was feared that they would explode; but the firemen kept the tanks cool. The premises were fully insured.

What is a Place of Business.—A somewhat interesting question has arisen in respect of the water-service for the new Town Hall at Rotherhithe. The Southwark and Vauxhall Water Company were asked to sanction the fixing of a water-meter in the building; but they declined to do so, on the ground that they only afford meter supplies to premises requiring a supply of water for business purposes. In all other cases, the water charges were considered a domestic rate, which must be levied on the rateable value of the premises supplied. The Vestry urge that the Town Hall is, to all intents and purposes, a place of business; and they point out that, the place being rated at £800 per annum, the Company on their 5 per cent. table, would be authorized, in the absence of a meter, to charge a water-rate of £40 a year, whereas the Vestry would not consume more than £5 worth of water. An effort is to be made to test the legal position of the Company on this point.

The Eastbourne Town Council and the Water Company.—A few weeks ago there was a great outcry at Eastbourne respecting the salty taste of the water furnished for domestic use; and it seems that a temporary supply was then introduced. An animated debate on the subject took place at the meeting of the Town Council yesterday week. Alderman Strange, the Chairman of the Sanitary Committee, while admitting that the present temporary supply was of unexceptionable quality, alleged that the Water Company, of which the Duke of Devonshire is Chairman, had been grossly dilatory, and that the town had suffered in consequence. He complained that the Company had withheld from the Corporation Engineer proper facilities for inspecting their works, and that, owing to their obstinacy, the majority of the inhabitants had been debarred from using the new supply. In the discussion which ensued, the members were unanimously in favour of the Council applying for parliamentary authority to take the water supply into their own hands; and in the end the Committee were instructed to consider the matter, and treat it as one of urgency.

Sales of Shares and Stock.—At Plymouth on Thursday, Messrs. Woolland and Son offered for sale £15,000 of ordinary stock in the Plymouth and Stonehouse Gaslight and Coke Company. Bidding started at £130 per cent., and rose to £150, at which price 78 lots of £100 each were disposed of. At Chatham last Tuesday, 30 £5 shares in the Brompton, Chatham, Gillingham, and Rochester Water Company were sold at prices varying from £15 16s. to £16; and, on the same occasion, two "D" shares (£8 10s. each) in the Rochester, Chatham, and Strood Gas Company fetched £33 each—the highest price ever realized. At Devonport on the 3rd inst., twenty original shares in the Devonport Gas and Coke Company changed hands at £11 2s. 6d. and £11 5s. each. Ten guaranteed shares in the same Company were also sold for £6 15s. each. At Bishop Auckland last week, 31 £25 shares in the Weardale and Shildon Water Company were disposed of at £39 10s. apiece. At other recent sales, twelve lots of £50 of stock in the Fareham Gas Company have been sold at £60; and £42 of stock at £50 5s. A bid of £230 has secured £101 of 10 per cent. consolidated stock in the Gosport Water-Works Company.

NEW "PENNY-IN-THE-SLOT" COOKERS.

Arranged specially for Prepayment Meters.

We have given particular attention to the strength and simplicity of these Cookers, which are constructed upon the principle of our celebrated "Eureka" Cooker, and are practically indestructible. They are very easily cleaned, and are all constructed in as many parts as possible, so that, in case of breakage, the parts may be readily and cheaply replaced.

No. 403 and 404.

No.	External Dimensions.			Oven.			Hot Plate.	No. of Boiling-Burners	Price.	White Enamelled Crown extra.
	High.	Wide.	Deep.	High.	Wide.	Deep.				
401	18½	13½	11½	14	11	9½	13½ by 11½	1	28/6	—
402	24½	15½	15	18	11	11	15½ ,, 15	2	40/-	2/6
403	30	18	17	19	11	11	18 ,, 17	2	45/-	2/6
404	30	18	17	19	13½	11	18 ,, 17	2	50/-	2/6
404	If fitted with Enamelled-Lined and Jacketted Door and Fire-Brick Crown, as adopted by The London Gaslight and Coke Co.								55/-	2/6

Any of these Cookers, except No. 401, can be fitted with Griller at an extra charge of 2/6; but the adoption of the Griller is not recommended for use with Prepayment Meters.

JOHN WRIGHT & CO., LIMITED,

The Oldest and Largest Gas-Stove Manufacturers in the World,

ESSEX WORKS, BIRMINGHAM, and 105, CHEAPSIDE, LONDON.

GWYNNE & BEALE'S

PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: 'GWYNNEGRAM, LONDON." Telephone No. 65,095.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.

Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK.

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.

Catalogues and Testimonials sent on application.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

JOHN WM. O'NEILL, Managing Director, Palmerston Buildings, Old Broad Street, London, E.C.

ANDREW STEPHENSON, AGENT. All communications re Oxide to be addressed to Palmerston Buildings.

WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 800 British Gas-Works.

ANDREW STEPHENSON, 182, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.

Telegrams: "Volcanism, London."

AMMONIACAL LIQUOR wanted.

BROTHERTON AND CO., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

GAS TAR wanted.

BROTHERTON AND CO., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SPENT OXIDE wanted.

BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SULPHURIC ACID for Sale.

BROTHERTON AND CO., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

BROTHERTON & CO.

Offices: Commercial Buildings, LEEDS. Correspondence invited.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.

Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.

READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

J. & J. BRADDOCK, Globe Meter Works, Oldham.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

Telegraphic Address: "Braddock Oldham."

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

PORTER & CO., Gowts Bridge Works, LINCOLN, Engineers, Ironfounders, and Contractors for the erection of Gas-Works for Towns, Villages, Mansions, Manufactories, Collieries, and Isolated Buildings, at home and abroad. Manufacturers of Retorts and Fittings, Condensers, Scrubbers, Purifiers, Valves, &c.; also of Girders, Wrought and Cast Iron Tanks, Iron Roofs, &c.

Telegraphic Address: "PORTER LINCOLN."

SPECIAL PAINT FOR GAS-WORKS.

JOHN E. WILLIAMS AND CO., VICTORIA PAINT WORKS, MANCHESTER.

Telegrams: "ENAMEL." National Telephone 1759.

SADLER & Co., Ld., Middlesbrough; ULVERSTON (BARROW); PORTSMOUTH; CARLTON (N.E.R.); and STOCKTON. Tar and Petroleum Distillers. Benzol and Petroleum Spirit, 700 and other Gravities specially prepared for Carburetting. SOLAR OIL for Gas Making Kerosene, &c.

Correspondence invited.

Telegraphic Address: "Sadler, Middlesbrough."

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WALTER THOMASON and SONS, Chemical Plumbers, &c., and Makers of Lead Saturators, &c., 21, WESTON STREET, BOLTON. Repairs of every description.

Please write for Estimate before ordering elsewhere.

It is Worth Your While to Buy DIRECT.

THE RELIANCE LUBRICATING OIL COMPANY SUPPLY on APPROVAL "RELIANCE" NON-CORROSIVE LUBRICANTS (which, through their superiority, have the largest sale in the world)—viz., Engine, Cylinder, and Machinery Oils, 11½d.; Spindle Oil, 8½d.; Gas-Engine and Dynamo Oils, 1s. 6d. per gallon; Barrels Free and Carriage Paid. Also Liquids for Gas Making, Enriching, &c.

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Depôts at Liverpool, Bristol, Hull, Glasgow and Newcastle-on-Tyne. Telegrams: "Subastral, London."

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OXIDE OF IRON BOG ORE.

BALE & CO.'S Oxide of uniform quality.

Sample and Price on application.

OXIDE PAINTS, OILS, SULPHURIC ACID, &c.

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OXIDE OF IRON.

FINEST Quality of Natural Bog Ore.

Particulars and price, apply to Mr. T. L. ARCHER, 20, Fennel Street, MANCHESTER.

SPENT OXIDE Wanted.

J. HARDMAN, Milton, STAFFS.

SULPHURIC ACID for Sale (B. O. V. and R. O. V.) made from Spent Oxide.

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CANNEL, COAL, ETC.

JOHN ROMANS & SON, EDINBURGH, Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.

Prices, &c., will be forwarded on application to No. 30, ST. ANDREW SQUARE, EDINBURGH, NEWTON GRANGE, NEWBATTLE, DALKEITH, } SCOTLAND.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c. CENTRAL PLUMBING WORKS, TOWN HALL SQUARE, BOLTON. Special Attention to Repairs.

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INCREASE the Efficiency of your PURIFIERS by adopting CRIPPS'S PATENT BYE-PASS VALVE in the lower Tiers of Sieves. Practical Experience proves their Economy. Engineers are repeating orders after thorough trial.

References and Particulars can be obtained from the Makers—

C. & W. WALKER, Midland Iron-Works, Donnington, near Newport, SALOP.

And J. EVERY & SON, Phœnix Iron-Works, LEWES.

WANTED, by a Married Man (age 27), a SITUATION to take charge of Small Gas-Works. Good Carbonizer; can do small Repairs on Works, and take Meters. Can have good Reference.

Address No. 2709, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Gas-Fitter. Well up in Iron and Compo. work, fixing Stoves, Regulators, Cookers, and Prepayment Meters, Meter Inspecting, and general routine of a Gas-Works.
Address No. 2707, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SOUTH AFRICA.

A GENTLEMAN sailing in October is open for good APPOINTMENT or AGENCY. Experienced Commercial Traveller; well up in Gas Appliances. First-class References.
Address No. 2710, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Situation as Outdoor SUPERINTENDENT. Fifteen years' practical Experience. Five years in present Situation as Manager and Collector. Has a thorough knowledge of Wet and Dry Meters, Main and Service laying, Internal Fitting, fixing Stoves, &c. A First-class Workman. Excellent References.
Address No. 2704, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Bricklayers, Retort Setters, and FURNACE BUILDERS.
Apply to JONAS DRAKE AND SON, Ovenden, HALIFAX.

WANTED, a Day Stoker for Small Works. Constant employment. Wages £1 per week.
Apply, by letter, to No. 2708, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MECHANICAL Draughtsman wanted for General Engineer's Works. Knowledge of Gas Plant preferred.
Apply, stating Age, Experience, References, and Salary required, to ALBION IRON-WORKS, Miles Platting, MANCHESTER.

GAS-STOVE Representative wanted for London and South Coast. Must be personally known to Gas Managers, and have good connection. State experience, &c.
Apply to ARDEN HILL AND CO., Gas Engineers, BIRMINGHAM.

WANTED, by a Provincial Gas Company, a MANAGING CLERK, with a practical knowledge of Gas Manufacture, &c.
Applications (with Testimonials), stating Age and Salary required, to be forwarded not later than Oct. 1, addressed to No. 2706, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR the Sale of Mantles for Incandescent Gas-Burners and a Patented Apparatus to prepare them by the Consumers themselves, the Manufacturers of an excellent mark require a GENERAL AGENT for England.
Please address A. N. 733, care of Mr. F. ALGAR, 11, CLEMENT'S LANE, E.C.

GAS-FITTER wanted for the Winter. Situation possibly a permanency. Iron and Compo. work, Main and Service laying, &c. Preference to one who can do Smithing.
STOKER also required. Must be steady; used to Steam-Jet, as well as Rotary Exhauster; and a good Shovel Charger.
Apply, stating Age and Wages required, to ROBT. WATSON, Gas-Works, HERTFORD.

ON SALE, or to Let on Hire, 50 to 100 8-ton Railway Coal-Waggons, with Side and Bottom Doors.
Apply to the DERBYSHIRE SILKSTONE COAL COMPANY, Limited, Albert Colliery, near CHESTERFIELD.

THE Wolverhampton Gas Company have FOR SALE, in perfect condition, six lengths of HYDRAULIC MAIN, 20 in. by 20 in., with 6-inch Dip-Pipes, to take the Gas from 128 Retort Mouthpieces. It will be sold in whole or part if desired.
For Particulars, apply to
JOHN ANNAN,
Manager.

DEAL AND WALMER GAS-WORKS.

TO BE SOLD immediately, to make more yard room, a GASHOLDER, 50 ft. by 16 ft., with Eight Handsome Columns, Tank Plates, and 6-inch Inlet and Outlet Valves. Can be seen up to the 28th of September inst. To be removed by Purchaser. Offer required.
W. R. HAMMOND,
Secretary.

THE Haslingden Union Gas Company invite TENDERS for their surplus TAR and LIQUOR, to be sent in not later than the 28th inst.
WOODCOCK AND SONS,
Secretaries.
West View, Haslingden.

BOROUGH OF NELSON.

TENDERS FOR TAR.

THE Corporation invite Tenders for the purchase of their surplus TAR and LIQUOR during the next Twelve Months.
Coal Carbonized, 20,000 tons.
Forms of Tender may be obtained from Mr. W. Foster, Gas-Works, Nelson.
Tenders, endorsed "Tar and Liquor," to be sent to the undersigned not later than the 24th inst.
R. M. PRESCOTT,
Town Clerk.
Town Hall, Nelson,
Sept. 11, 1896.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Isle of Thanet Gaslight and Coke Company are prepared to receive TENDERS for the surplus TAR produced at their Works, Margate, from Oct. 1, 1896, to May 31, 1897.
For all Particulars as to Quantity and Terms of Delivery, apply to the Engineer and Manager, Mr. H. H. Jones.
Sealed tenders, addressed to the Chairman of the Company, and endorsed "Tender for Tar," to be delivered at these Offices not later than Nine a.m. on the 25th of September.
The Directors do not bind themselves to accept the highest or any tender.
By order,
THOS. C. FULLER,
Secretary.
Gas-Works, Margate,
Sept. 12, 1896.

ISLE OF THANET GASLIGHT AND COKE COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for a Parcel of SULPHATE of AMMONIA, which will be ready for delivery about the 28th inst.
For Samples and Conditions of Sale and Delivery apply to the Engineer and Manager, Mr. H. H. Jones.
Sealed tenders, addressed to the Chairman of the Company, and endorsed "Tender for Sulphate," to be delivered at these Offices not later than Nine a.m. on the 25th of September.
The Directors do not bind themselves to accept the highest or any tender.
By order,
THOS. C. FULLER,
Secretary.
Gas-Works, Margate,
Sept. 12, 1896.

URBAN DISTRICT COUNCIL OF BUXTON.

CONTRACT FOR CANNEL.

THE Gas Committee invite Tenders for the supply of good CANNEL for One, Two, or Three Years, at the rate of about 5000 Tons per annum, to be delivered at their Siding (on the Midland Railway) in Ashwood Dale, Buxton.
Tenders, endorsed "Tender for Cannel," addressed to the Chairman of the Gas Committee, to be delivered at the Town Hall not later than noon on the 30th inst.
Forms of Tender and other Particulars may be obtained of Mr. Geo. Smedley, Gas Department, Town Hall, Buxton.
The Council do not bind themselves to accept the lowest or any tender.
By order,
JOSIAH TAYLOR,
Clerk to the Council.
Buxton, Sept. 14, 1896.

TODMORDEN URBAN DISTRICT COUNCIL.

OXIDE OF IRON—"BOG ORE."

THE Gas Committee of the above Council are prepared to receive TENDERS for the supply of 100 Tons of the best Natural BOG ORE, delivered at the Railway Company's Station, Todmorden.
Full Particulars can be obtained from the Engineer and Manager, Mr. Hy. Hawkins.
Tenders, marked "Oxide of Iron," and addressed to the undersigned, are to be delivered at the Town Hall, Todmorden, not later than Ten a.m., on Tuesday, the 22nd day of September, 1896.
The lowest or any tender will not necessarily be accepted.
By order of the Council,
DAN SUTCLIFFE,
Clerk.

CORPORATION OF KENDAL.
(GAS DEPARTMENT.)

TENDERS FOR SULPHURIC ACID.

THE Gas and Water Committee of the above Corporation are prepared to receive TENDERS for the supply of from 40 to 50 Tons of the best SULPHURIC ACID, of a strength of 144° to 146° Twaddel Hydrometer, and to contain not less than 79 to 80 per cent. of acidity (minimum). To be delivered in Carboys at Kendal Station in such quantities as may be required from time to time until the 30th of September, 1897.
Price to include Carriage of returned empty Carboys to Contractor's Works.
Tenders, endorsed "Tender for Sulphuric Acid," to be addressed to the Chairman of the Gas and Water Committee, Gas-Works, Kendal, and sent in on or before Saturday, Sept. 19, 1896.
T. N. RITSON, Assoc.M.Inst.C.E.,
Engineer and Manager.

CORPORATION OF KENDAL.
(GAS DEPARTMENT.)

TENDERS FOR TAR.

THE Gas and Water Committee of the above Corporation are prepared to receive TENDERS for their surplus TAR for the Year ending the 30th of September, 1897. (Estimated quantity about 250 Tons.)
Price per ton delivered into Contractor's Tanks on Rail at Kendal Station (L. & N.W. Railway), or in Boats alongside the Gas-Works Wharf on the Lancaster and Kendal Canal.
In case of frost or other cause stopping the traffic on the Canal, delivery to be accepted at Kendal Station in Contractor's Tank-Wagons.
Payment, monthly cash.
Tenders, endorsed "Tender for Tar," to be addressed to the Chairman of the Gas and Water Committee, Gas-Works, Kendal, and sent in on or before Saturday, Sept. 19, 1896.
T. N. RITSON, Assoc.M.Inst.C.E.,
Engineer and Manager.

SOWERBY BRIDGE URBAN DISTRICT COUNCIL.

THE Gas Committee of the Sowerby Bridge Urban District Council are prepared to receive TENDERS for the construction of a STEEL TANK and THREE-LIFT GASHOLDER.
Each party or firm tendering to furnish his own Designs and Specifications.
All Particulars respecting Gasholder and Tank may be obtained on application to Mr. John Marsland, Manager, Gas-Works, Sowerby Bridge.
Sealed tenders, endorsed "Gasholder," addressed to the Chairman of the Gas Committee, to be sent to the undersigned not later than Sept. 28, 1896.
The Committee do not bind themselves to accept the lowest or any tender.
GODFREY RHODES AND EVANS,
Solicitors and Clerks to the Council.
Sowerby Bridge, and
Commercial Bank Chambers, Halifax,
Sept. 10, 1896.

COMMERCIAL GAS COMPANY.

NOTICE is Hereby Given, that an ORDINARY MEETING of the Commercial Gas Company will be holden at the Cannon Street Hotel, in the City of London, on Thursday, the 1st of October, 1896, at Twelve o'clock at Noon, to receive the Directors' Report and the Accounts of the Company for the Half Year ended the 30th of June, 1896, and to declare a Dividend.
The STOCK TRANSFER BOOKS WILL BE CLOSED from the 17th of September inst. to the 1st of October next, both days inclusive.
By order of the Board,
H. D. ELLIS,
Secretary.
Offices: Stepney,
Sept. 8, 1896.

EAST LONDON WATER-WORKS COMPANY.

NOTICE is Hereby Given, that the TRANSFER BOOKS in respect of the Ordinary Stock WILL BE CLOSED on the 23rd of September inst., and RE-OPENED on the 15th day of October next, on which day the Dividends on this Stock will be payable.
By order,
I. A. CROOKENDEN,
Secretary.
St. Helen's Place, E.C.,
Sept. 10, 1896.

EAST LONDON WATER-WORKS COMPANY.

NOTICE is Hereby Given, that the HALF-YEARLY ASSEMBLY of Proprietors will be held at the Company's Offices, St. Helen's Place, Bishopsgate Street, E.C., on Thursday, the 8th of October, 1896, at Twelve o'clock Noon precisely, pursuant to Act of Parliament.
The TRANSFER BOOKS in respect of the ORDINARY STOCK WILL BE CLOSED on the 23rd of September, and RE-OPENED on the 15th of October, on which day the Dividends on this Stock will be payable.
By order,
I. A. CROOKENDEN,
Secretary.
St. Helen's Place, E.C.,
Sept. 12, 1896.

BRITISH GASLIGHT COMPANY, LIMITED.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at this Office, on Wednesday, the 30th inst., at Half-past Twelve o'clock precisely, to transact the usual Business, to declare a Dividend for the Half Year ended the 30th of June last, and to elect two Directors and one Auditor in the place of those who go out by rotation, but who are eligible to be re-elected.
Notice is Hereby also Given, that the TRANSFER BOOKS of the Company WILL BE CLOSED on the 19th inst., and RE-OPENED on the 1st of October.
By order of the Court of Directors,
FREDERIC LANE LINGING,
Secretary.
Chief Office: No. 11, George Yard,
Lombard Street, London, E.C.,
Sept. 9, 1896.

PATENTS, DESIGNS, and TRADE MARKS ACTS, 1883 to 1888.

NOTICE is Hereby Given, that The New INCANDESCENT (SUNLIGHT PATENTS) GAS LIGHTING COMPANY, LIMITED, of 40, Coleman Street, in the City of London, pursuant to an Order of the High Court of Justice, APPLIED for LEAVE to AMEND the SPECIFICATION of the LETTERS PATENT No. 2110 of 1890, granted to Carl Dellwik for "Improvements in the Process of Treating Incandescents for use with Gas Lamps or Burners."
Particulars of the proposed Amendments were set forth in the "Illustrated Official Journal (Patents)" issued on the 2nd September, 1896.
Any person or persons may give notice of opposition to the Amendment (on Form G) at the Patent Office, 25, Southampton Buildings, London, W.C., within one calendar month from the date of the said Journal.
(Signed) H. READER LACK,
Comptroller-General.

ISSUE OF STOCKS AND SHARES BY AUCTION UNDER PARLIAMENTARY POWERS.

MR. ALFRED RICHARDS undertakes the issuing by Auction of GAS AND WATER SHARES under Parliamentary Powers.
He also holds MONTHLY SALES of GAS AND WATER SHARES at the Auction Mart, Tokenhouse Yard, E.C.
Terms for the issuing of Capital, and also for offering to auction Gas and Water Shares, and all Particulars relating thereto, may be had of Mr. Alfred Richards.
Offices: 18, FINSBURY CIRCUS, E.C.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED,

— *v* —

"DE MARE" COMPANY.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED.

— *v.* —

"SUNLIGHT" COMPANY.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED, HEREBY GIVE NOTICE, as follows:—

VALIDITY. The Company's Patent has been declared VALID ON ALL POINTS after a Fifteen-Day Trial.

NATURE OF INVENTION. The Invention was described by Mr. Justice Wills as a "PIONEER INVENTION."

SCOPE OF PATENT. The Patent HAS BEEN GIVEN A WIDE CONSTRUCTION; and it was held that the protection given by it was not confined to Mantles manufactured according to the particular prescriptions set out in the Specification.

SHAPE OF MANTLE. The Judge held that a Mantle, even if made in a different form or shape (such as the "De Mare" Fringe or Plume), IS STILL AN INFRINGEMENT of the "Welsbach" Patent.

"DE MARE" JUDGMENT. Judgment for an INJUNCTION, WITH FULL COSTS, has been given against the "De Mare" Incandescent Gas-Light System.

"SUNLIGHT" JUDGMENT. Judgment was given AGAINST the "Sunlight" Incandescent Gas-Lamp Company, Limited, on the question of the VALIDITY OF THE PLAINTIFFS' PATENT.

"SUNLIGHT" MANTLES. Last about 100 hours.

"WELSBACH" MANTLES. Last about 1000 hours.

"Sunlight" Mantles BURN DOUBLE THE GAS to produce the same candle power as the Incandescent Gas-Light Company's Mantles.

Users of "Sunlight" Mantles are applying to the Incandescent Gas-Light Company to REPLACE THEM BY THEIR OWN MANTLES.

WARNING. Users of the Incandescent Gas-Light Company's Mantles upon "Sunlight" Burners ARE INFRINGERS OF THE COMPANY'S PATENT, AND WILL BE AT ONCE PROCEEDED AGAINST.

COSTS. Certificates of the Validity of the Company's Patent have been granted both by Mr. Justice Romer and Mr. Justice Wills entitling the Company to Solicitor and Client Costs, which will, IN ALL CASES, BE RIGOROUSLY ENFORCED.

INFRINGERS. The Incandescent Gas-Light Company WILL TAKE PROCEEDINGS AGAINST ALL PERSONS INFRINGING THEIR PATENT WHETHER

MAKERS,
WHOLESALE DEALERS
RETAILERS
or
USERS.

Users of the Company's Mantles upon Burners not sold by the Company ARE INFRINGERS.

"LIMITED LICENSE" WARNING. Judgments have already been obtained against such users from Mr. Justice Chitty, Mr. Justice Stirling, Mr. Justice Kekewich, and Mr. Justice North.

FAITHFULL & OWEN,
11, Victoria Street,
Westminster.

Solicitors to the Incandescent Gas-Light Company, Limited.

April, 1896.

NOTICE.

The attention of the METEOR INCANDESCENT LIGHTING COMPANY, LIMITED, having been again called to the Advertisements inserted in various papers by the Incandescent Gas-Light Company, Limited, of Palmer Street, Westminster, to the effect that the "Meteor" Incandescent Gas-Lights are an Infringement of their Patents, and that they will bring Actions for Infringement against all persons found dealing in any manner with such Lights, the METEOR INCANDESCENT LIGHTING COMPANY, LIMITED, HEREBY GIVE NOTICE that they are advised that the "Meteor" Incandescent Lights in no way infringe any of the Patents of the Incandescent Gas-Light Company, Limited, that an action has been commenced to restrain such threats, and that they are PREPARED TO FULLY INDEMNIFY ALL PURCHASERS, DEALERS, AGENTS, and USERS of their Lights against any Legal Proceedings on the part of the Incandescent Gas-Light Company, Limited.

WILSON, BRISTOWS, & CARPMAEL,
1, Copthall Buildings, London, E.C.,
Solicitors to the Meteor Incandescent Lighting Company, Limited, of 35, New Broad Street, London, E.C.

Nov. 30, 1895.

Price 5s. per 100.

THE USE OF

GAS LIME IN AGRICULTURE.

By Dr. A. VOELCKER.

A 4pp. Leaflet for Distribution among Farmers and others.

LONDON: Walter King, 11, Bolt Court, Fleet St., E.C.

WENHAM LAMP.

WEBER & CO., Steatite Makers,

12 & 13, BRIDGEWATER STREET,

LONDON, E.C.

Now supply direct to the Trade, RINGS and BUTTONS, same Quality and Sizes as we manufactured exclusively for the late Wenham Company; and WE ALLOW MUCH HIGHER DISCOUNTS.

PRICE'S COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

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OXIDE OF IRON.

JAMES HUNTER, MINER, AND SHIPPER OF NATURAL IRISH BOG ORE.

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Samples and Prices on application.

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QUOTATIONS ON APPLICATION TO

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NEWBATTLE COLLIERIES,

DALKEITH, N.B.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

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RAVENSTHORPE, NEAR DEWSBURY.

JAMES OAKES & Co.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

THOMAS TURTON AND SONS, LIMITED,
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS,
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
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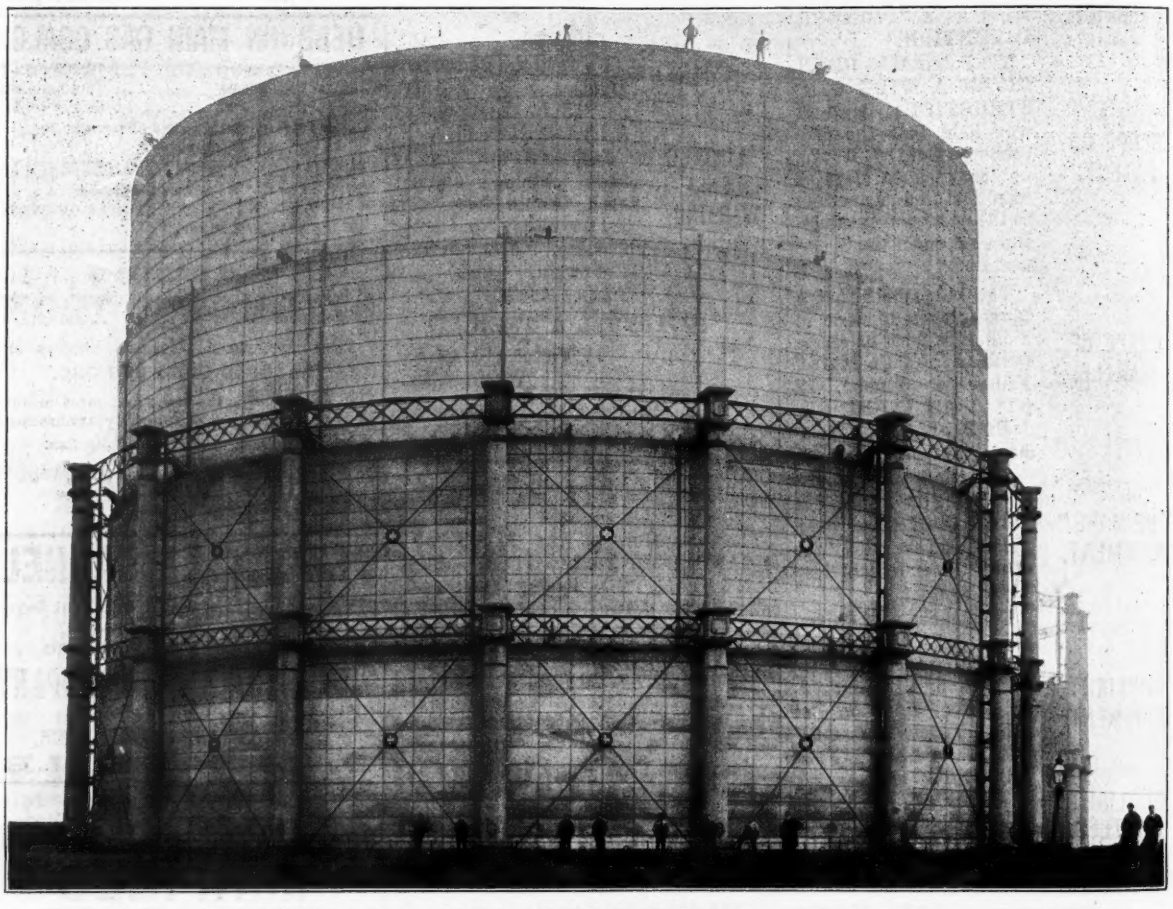
LONDONDERRY GAS COALS
FROM THE
MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.
Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by
Mr. John Pattinson, F.C.S., F.I.S.
FOR PRICES AND PARTICULARS, APPLY TO
S. J. DITCHFIELD,
SEAHAM HARBOUR, COUNTY OF DURHAM.

THE SILICA FIRE-BRICK COMPANY,
OUGHTIBRIDGE, near SHEFFIELD,
MANUFACTURE
SILICA BLOCKS, BRICKS, AND CEMENT
OF SUPERIOR QUALITY
FOR GAS-FURNACES.
Trade Mark: "SILICA."
These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their
GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.



BIRKENHEAD GASHOLDER, FOUR LIFTS
(160 FEET DIAMETER, EACH 80 FEET DEEP).

The TWO INNER LIFTS were added on the ROPE SYSTEM.
The THIRD LIFT is controlled by ROPES, as well as by Columns.

EXTRACT FROM THE ENGINEER'S REPORT, FEBRUARY 11, 1896.

"During a great gale on October 2nd, the holder was at its greatest height (120 feet); and I can safely say it was the steadiest holder on the works. In fact, throughout the whole of October, we experienced exceptionally heavy weather; and, of course, the holder during that time was tested in all positions, but with the same unvarying steadiness.
(Signed) T. O. PATERSON, Engineer."

THE HOLDERS in which the ROPE SYSTEM has been adopted have a capacity of 15,200,000 cubic feet.

ASHMORE, BENSON, PEASE, & CO., LTD., Stockton-on-Tees.

"Invaluable to those engaged in lighting or water works."—ENGINEERING.

Now Ready for 1896.

TWENTIETH YEAR OF ISSUE.

GAS and ELECTRIC LIGHTING COMPANIES' DIRECTORY and STATISTICS,

With List of Officials, Engineers, and Managers,

Price, Cloth, 6s.

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With List of Officials, Engineers, and Managers,

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FIRE-CLAY & BRICK WORKS, STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of

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SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

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PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation.

Yield of Gas Per Ton . . 11,205 Cubic Feet.
Illuminating Power, $16\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality) $13\frac{3}{4}$ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton . . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . $13\frac{1}{2}$ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash . . . . . 1·34 Per Cent.
Tar . . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor $94\frac{1}{2}$ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COAL-FIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,

HOLMSIDE AND SOUTH MOOR OFFICES, NEWCASTLE-UPON-TYNE.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE BOGHEAD CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 17·8 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

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THOS. W. DANCE & SONS,

COAL OWNERS, NEWCASTLE-ON-TYNE

OR

E. FOSTER & CO.,

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THE DRUM

FOR PUMPING AIR, WATER, SEMI-FLUIDS, &

See Advertisement in last and next issue.

THORNLEY GAS COALS

WORKED BY THE

WEARDALE IRON & COAL Co., Ld.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by

Messrs. J. & H. S. PATTINSON, *May 28, 1895,*

Yield of Gas per Ton . . 10,500 Cub. Ft.
Illuminating Power . . 16·9 Candles.
Coke (of good quality) . . 67·5 per Cent.
Sulphur . . . . . 0·58 ,,
Ash . . . . . 2·73 ,,

For Price, &c., apply to the

WEARDALE IRON & COAL Co., Ld

QUAYSIDE, NEWCASTLE-ON-TYNE.

BOLDON GAS COALS.

Worked by THE HARTON COAL CO., LTD.

Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton . . 10,500 Cubic Feet.
Illuminating Power . . 16·9 Candles.
Coke . . . . . 66·7 Coke.
Sulphur . . . . . 0·86 Sulphur.
Ash . . . . . 2·04 Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Danish Gas Company, Bombay Gas Company, San Paulo Gas Company, Alliance and Dublin Consumers' Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

For Prices, &c., apply to the

HARTON COAL COMPANY,

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Newcastle-on-Tyne.

W. H. PARKINSON,

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THE

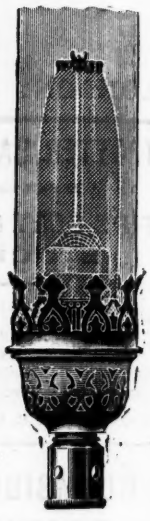
Incandescent Gas-Light Co., LIMITED.

(WELSBACH Patents.)

Pronounced by Mr. Justice Wills, and confirmed by the Court of Appeal, to be

"A PIONEER INVENTION."

FURTHER DEVELOPMENTS; ENORMOUS ECONOMY;
IMMENSE SUPERIORITY; IMPORTANT IMPROVEMENTS.

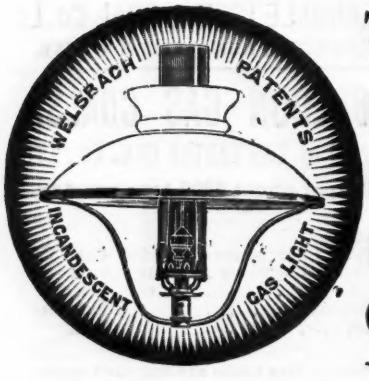


THE NEW "GEM" BURNER, 5s. 6d.
THE NEW "GEM," 5s. 6d.
THE NEW "GEM," 5s. 6d.

35-Candle Power from $1\frac{3}{4}$ Cubic Feet of Gas!!!

THE "GEM" BURNER IS SPECIALLY SUITABLE FOR DOMESTIC LIGHTING.
GREATLY IMPROVED DISTRIBUTION OF LIGHT.

It is the Brightest "Gem."
20 Candles per Cubic Foot of Gas!!!



The WELSBACH INCANDESCENT GAS-LIGHT is the

MOST ECONOMICAL
MOST BRILLIANT
MOST HEALTHY
CLEANEST GAS

} LIGHT

THE "GEM" BURNER, 5s. 6d.
THE "C" BURNER, 6s. 6d.
THE "C" BYE-PASS BURNER, 7s. 6d.

Further Particulars and Price List can be had on application to the Company's Agents or leading WHOLESALE HOUSES, or to the

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WEST'S GAS IMPROVEMENT COMPANY, LTD.,

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AND

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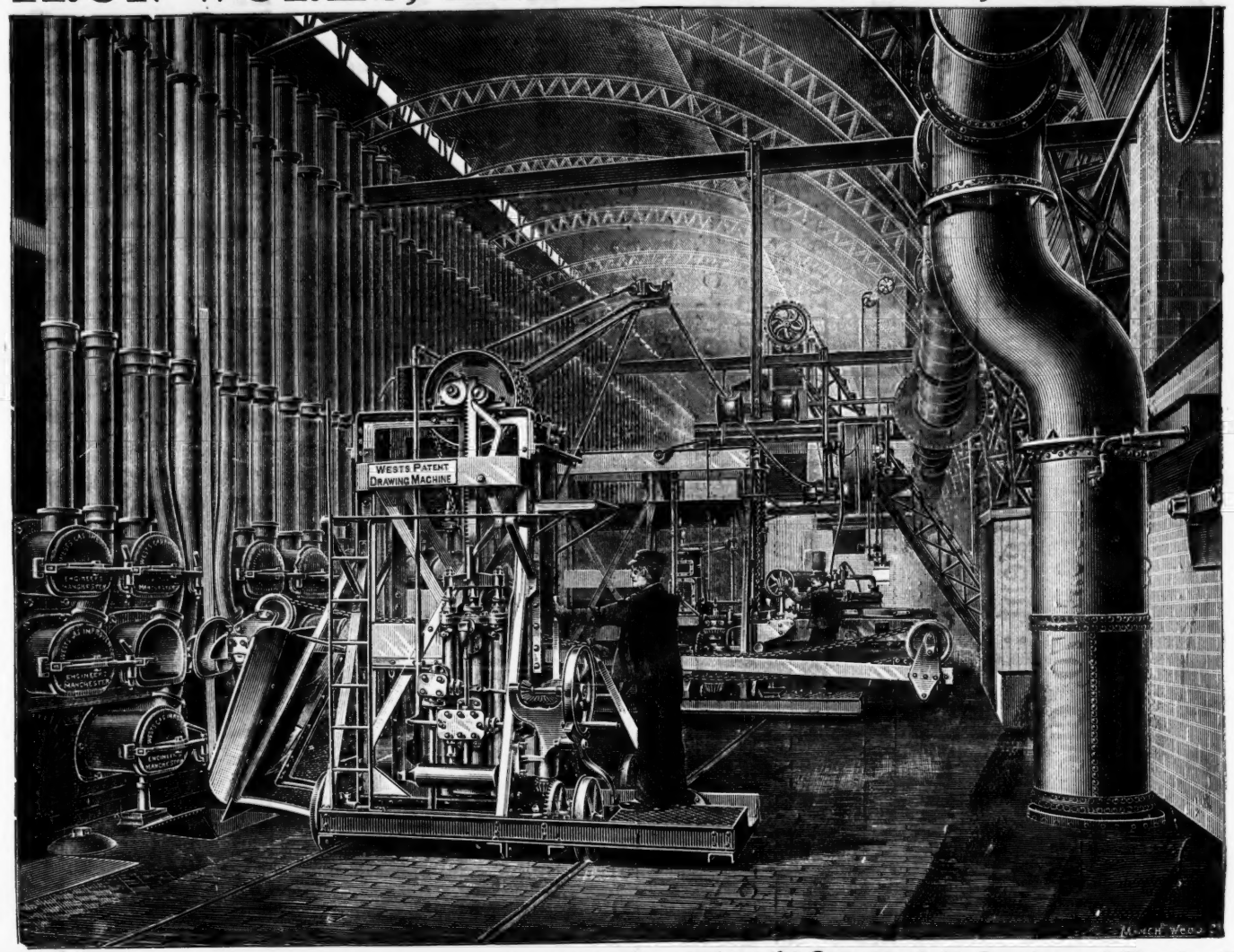
WEST'S MANUAL AND POWER MACHINERY FOR CHARGING AND DRAWING GAS-RETORTS.



Interior of Retort-House at the Bradford Road Gas-Works, Manchester, showing the Compressed-Air Drawing and Charging Machines.

AND

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OVER 560,000 LINEAL FEET OF RETORTS DAILY ARE CHARGED AND DRAWN BY WEST'S MACHINES.

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Patent Penny-in-the-Slot AUTOMATIC METER with the latest improvements. Fraud Proof, Perfect in Action, Accurate in Registration, Instantaneous Price Adjustment *in situ* without Change Wheels.

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IN ENDLESS VARIETY.

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SPECIAL FITTINGS FOR THE AUTOMATIC BUSINESS.

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MESSRS. HUMPHREYS & GLASGOW

Have constructed their EUROPEAN type of

CARBURETTED WATER-GAS PLANT

At the following Gas-Works:—

Copenhagen	700,000 Cub. Ft.	Brighton	1,500,000 Cub. Ft.
Belfast	1,700,000 ,,	Preston	1,500,000 ,,
Glasgow	300,000 ,,	Southport	750,000 ,,
Brussels	700,000 ,,	Bath	1,000,000 ,,
Liverpool	3,500,000 ,,	New York	1,200,000 ,,
Tottenham	750,000 ,,	Newburgh, N.Y.	350,000 ,,
Santiago	400,000 ,,	Tottenham (Second Contract)	750,000 ,,
Swansea	750,000 ,,	St. Joseph, Mo.	750,000 ,,

And have now under Contract:—

Belfast (Second Contract)	4,500,000 Cub. Ft.	Edinburgh	2,000,000 Cub. Ft.
Shanghai	225,000 ,,	Stockton-on-Tees	500,000 ,,
Winchester	200,000 ,,	Stockport	500,000 ,,
Hoylake	125,000 ,,	Norwich	1,000,000 ,,
Manchester	3,000,000 ,,	Guildford	350,000 ,,
Brussels (Second Contract)	700,000 ,,	Syracuse, N.Y.	850,000 ,,
Holyoke, Mass.	600,000 ,,	Bordentown, N.J.	125,000 ,,

In addition to which the previous Installations of The Gaslight and Coke Company under this System have a total capacity of 10,000,000 cubic feet per diem.

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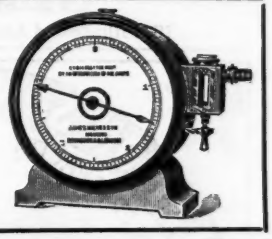
LONDON: LAMBETH BRASS & IRON CO., Ltd., Short St., LAMBETH.

JAMES MILNE & SON, LTD.,

GAS ENGINEERS,
MILTON HOUSE WORKS, EDINBURGH.
LONDON. — GLASGOW. — LEEDS.



D. HULETT & CO., LTD.

55 & 56, High Holborn, London.

GAS SERVICE CLEANSERS.
LAMP TORCHES.

DRY GAS-METER MAKERS.

WROUGHT-IRON TUBES & FITTINGS.
STREET LAMPS & POSTS.

PRICE LISTS ON APPLICATION.

STOURBRIDGE
RETORTS AND FIRE-BRICKS.
BEST QUALITY.

KING BROTHERS, STOURBRIDGE.
[See Illustrated Advertisement, Sept. 1, p. 436.]

BOWENS' Ltd. Successors,
STOURBRIDGE.

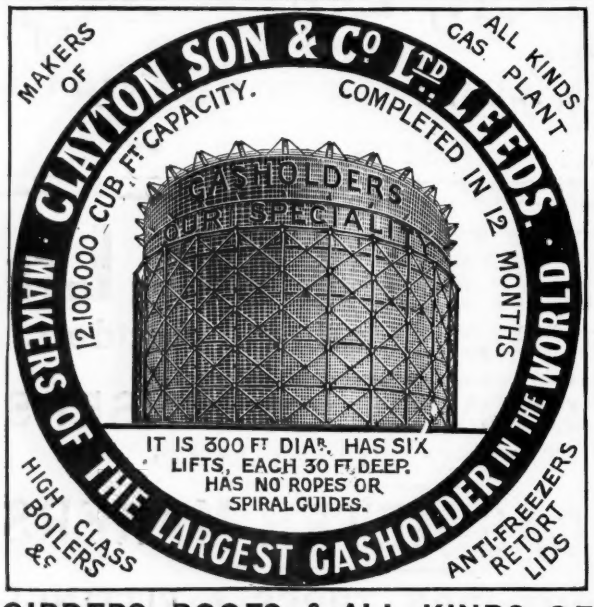
MANUFACTURERS OF
BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.
Established 1860.

OXIDE OF IRON.
NATURAL BOG ORE FROM OWN MINES.
Samples and Prices on application.

Wm. H. MÜLLER & CO.,
81, PALMERSTON BUILDINGS, LONDON, E.C.
TRADE MARK: "Compascum." Telegraphic Address: "FERRUM."

ARROL-FOULIS
Patent Automatic Machinery
FOR
DRAWING AND CHARGING GAS-RETORTS.

Full Particulars may be obtained from the Sole Makers,
SIR WILLIAM ARROL & CO., Limited,
GLASGOW.
[See Illustrated Advertisement, Sept. 1, p. 437.]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CLAYTON, SON & Co LTD LEEDS.
ALL KINDS GAS PLANT
12,100,000 CUB. FT. CAPACITY.
COMPLETED IN 12 MONTHS
GASHOLDERS
SPECIALITY
MAKERS OF THE LARGEST GASHOLDER IN THE WORLD
IT IS 300 FT DIAM. HAS SIX LIFTS, EACH 30 FT. DEEP. HAS NO ROPES OR SPIRAL GUIDES.
HIGH CLASS BOILERS &c
ANTI-FREEZERS RETORT LIDS

GIRDERS, ROOFS, & ALL KINDS OF STRUCTURAL IRONWORK.

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MANUFACTURERS OF GASELIERS IN GLASS AND METAL.

WILSON CARTER & PEARSON,
GAS COAL AND CANNEL FACTORS,
Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.
ADDRESS CHIEF OFFICES:
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WILLIAM INGHAM & SONS,
Incorporated with the Leeds Fire-Clay Company, Ltd.,
WORTLEY FIRE-CLAY WORKS,
Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—
1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT
MACHINE-MADE GAS-RETORTS.

Gas-Bags for Mains. High Water-Boots. Woollen Miners' Jackets.

Delivery and Suction Hose, Gutta-Percha Acid Bottles, Leather Driving Bands, Woven Canvas Hose for Fire-Engines, Wedge and Square Gas-Bags, Air and Water Beds for Invalids, Oil Tarpauling Coats, Trousers, Hats, &c., Squeegees for cleansing Pavements, &c., Billiard and Bagatelle Cush, Tricycle Tyres, Leather Hose, Cotton Waste, Engine Cloths, Oils, &c., India-rubber Waterproof Garments for Walking, Driving, or Sporting Wear, Diving and Wading Dresses, Printers' Blankets, Iron Wheels and Rollers covered with India-rubber. Stokers' Gloves, 14s. 6d. per dozen.

Write for Price List to
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The Climax of Regenerative Gas Lighting!!

THE
"VERTMARCHE"
A 280-CANDLE POWER
PLAIN IRON LAMP,
CLASS A— **55/-**
LIGHT for LIGHT
less than half the price of any other Regenerative Lamp.
Manufactured in England.

HENRY GREENE & SONS,
153 & 155, CANNON STREET,
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PARTICULARS AND PRICES FREE. AGENTS WANTED.

GODDARD, MASSEY, & WARNER'S

IMPROVED

Sulphate of Ammonia Apparatus.

The most successful and approved Apparatus known up to the present time.

FOR REFERENCES, PARTICULARS, TESTIMONIALS, AND PRICES, APPLY TO

GODDARD, MASSEY, & WARNER,

ENGINEERS,

NOTTINGHAM.

The Apparatus has been supplied to the following Firms—

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Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

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Over 292,000,000 Cubic Feet of Gas per Day is passing through about 550 of these Machines.

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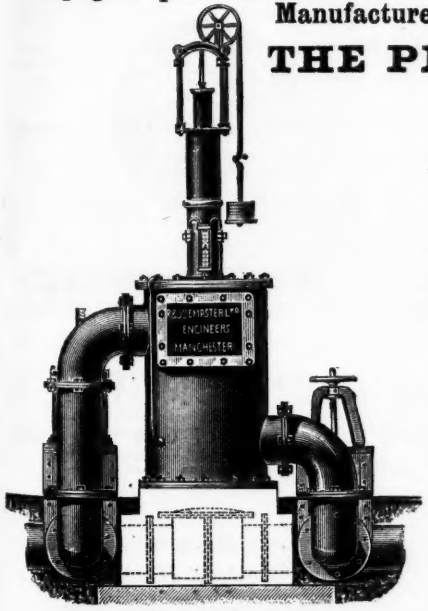

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This Apparatus is in very general use in most of the Gas-Works on the Continent and in America; over **550** being in use in different parts of the World for condensing and arresting all Tar Particles and Vapours from the Gases from Coal, Oil, and Wood.

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So effective is this Apparatus that a piece of white paper placed over a Test-Tap on the Inlet of the Machine is immediately covered with Tar, whilst on the Outlet the white paper remains perfectly clean.

The Machines are made in the following sizes, for Works producing per 24 hours—

	Cubic Feet.		Cubic Feet.
0	35,000	5	500,000
1	70,000	6	700,000
2	140,000	7	1,240,000
3	210,000	8	1,750,000
4	350,000	For larger Makes, two Machines are recommended.	

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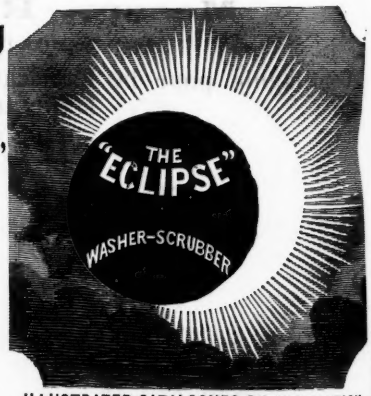

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Which is efficiently dealing with a total of **85,600,000** Cubic Feet of Gas per day.

Repeat Orders speak for themselves, some of which are given below—

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Sheffield United Gas Company	2 Machines	1,500,000 each.	Manchester Corporation. .	2 Machines	4,000,000 each.
Do. do.	2 ,,	4,000.000 ,,	Do. do. . .	1 Machine	3,000,000
Halifax Corporation . . .	2 ,,	3,000,000 ,,	Rochester, Chatham, & Strood . . .		1,000,000
Keighley Corporation . .	2 ,,	1,000,000 ,,	Do. do. . . .		1,500,000

CONTRACTORS TO HER MAJESTY'S GOVERNMENT.

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